O. Tolstikov, Colonel General of the Air Force,
"United States Civil Defense," in
The Nuclear Age and War (Iadernyi vek i voina),
edited by A. A. Grechko,
Marshal of the Soviet Union,
Moscow, Izvestiia Publishing
House, 1964, pp. 123-132;
translated from the Russian
by Nadia Derkach, the RAND
Corporation, December, 1965
LT-65-106

It is clear that civil defense will be that much stronger if the moral and political unity of the citizens is strong and the citizens are rallied around the true ideas which can inspire people to heroic deeds and sacrifices.

The difficulties of United States civil defense in staffing its forces are further aggravated by the fact that the population has been frightened by the horrors of nuclear war. The fear which has been instilled into Americans turns like a boomerang against those who fanned it.

The October 1962 days of the Caribbean crisis clearly illustrated the complete inability of U. S. civil defense to carry out its assignment.

Secret

DIRECTORATE OF
INTELLIGENCE

Intelligence Report

Civil Defense in the Soviet Union

Secret

Copy No. 213

May 1969

CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
15 May 1969

INTELLIGENCE REPORT

Civil Defense in the Soviet Union

Summary

Soviet political and military leaders at the 23rd Party Congress in 1966 reaffirmed their belief in the importance of a vigorous civil defense program. Since then, there has been a general rise in the level of civil defense activity in the Soviet Union.

In part the renewed emphasis reflects a conviction that a strong civil defense posture would help the USSR survive a nuclear war, but beyond that it also serves as a means for instilling a greater degree of patriotism and discipline in the populace. The regime's growing concern over the danger of liberal influences has stimulated increased reliance on paramilitary-type programs for large-scale indoctrination.

No other country has informed its people as thoroughly on the effects of nuclear, biological, and chemical weapons. Soviet citizens now are engaged in the sixth compulsory civil defense instruction program since 1955, and civil defense has become a required subject in elementary and secondary schools throughout the country. Workers are also participating in compulsory training. An extensive network of staff schools trains leaders for civil defense duties. The effect of all this indoctrination cannot be measured, but its pervasiveness has probably conditioned most of the populate to follow orders and take self-help measures in an emergency.

Note: This report was produced solely by CIA. It was prepared by the Office of Strategic Research and coordinated with the Office of Current Intelligence and Economic Research.

FOR EXTERNAL PUBLICATION

Radio Moscow in Mandarin to China, Nov. 3, 1978.

"However, the fact is that China's digging deep tunnels can never protect the Chinese masses from nuclear bombing or even protect them from conventional heavy bombs."

* * * * * * * * * * *

Radio Moscow World Service in English, Nov. 16, 1978

"The U.S. Administration is going to launch a 5-year program of civil defense. - - - The only real safety for the Americans is strengthening friendship with the Soviet Union, not bomb shelters."

FOR INTERNAL PUBLICATION

Moscow Voyennyye Znaniya in Russian No. 5, May 1978, p. 33.

"It is appropriate to say that we still meet people who have an incorrect idea about defense possibilities. The significant increase in the devastating force of nuclear weapons compared with conventional means of attack makes some people feel that death is inevitable for all who are in the strike area. However, there is not and can never be a weapon from which there is no defense. With knowledge and the skillful use of contemporary procedures, each person can not only preserve his own life but can also actively work at his enterprise or institution. The only person who suffers is the one who neglects his civil defense studies."

Cristy, G. A. and C. H. Kearny, Expedient Shelter Handbook, ORNL-4941, Oak Ridge National Laboratory, Oak Ridge, Tennessee, August 1974.

EXPEDIENT SHELTER HANDBOOK

The decade of the seventies has already introduced many tremendous changes in the strategic situation. The present clear and admitted superiority of the Soviet Union both in weapons and in weight of their missile force is a sharp contrast to the massive superiority of the U.S. in nuclear weapons in the fifties and early sixties.

However, the Soviet Union has done more than achieve a state of superiority in nuclear weapons (a condition which has been accepted by the U.S. in the Interim Agreement on Offensive Weapons in conjunction with the Strategic Arms Limitation Treaty (SALT); the Soviet Union has also developed a strategic evacuation plan which can have a vital impact upon the strategic balance, especially when this balance depended for so long upon an assured destruction policy. The Soviet evacuation plan is a well organized and sophisticated plan based upon a clear statement of Soviet nuclear policy. The Soviet Union does not subscribe to the doctrine that nuclear war means the end of mankind. On the contrary, it instructs and prepares its citizens on how to survive such a war. Marshal V. I. Chuykov puts it this way:

> "Without slighting the serious consequences of a possible war, we should in all responsibility state that there is no poison for which there cannot be an antidote nor can there be a weapon against which there is no defense. Although the weapons we have examined are called mass weapons, with the knowledge and skillful use of modern defense measures they will not affect masses, but only those who neglect the study, mastery, and use of these measures."
>
> "Protection of the population is implemented by dispersing and evacuating the people to outlying areas and providing them protective shelters and personal means of protection."
>
> —— Marshal V. I. Chuykov, "Civil Defense as Common Concern," *Nauka i Zhizn*, (Science and Life), No. 1, 1969.

CIVIL DEFENSE

(Grazhdanskaya Oborona)

Authors

P. T. Yegorov, I. A. Shlyakhov, and N. I. Alabin

Publishing House for Higher Education

(Vysshaya Shkola)

Second Edition, Moscow (1970), 500,000 copies

ЕГОРОВ П. Т., ШЛЯХОВ И. А., АЛАБИН Н. И.

ГРАЖДАНСКАЯ ОБОРОНА

Изд. 2-е, переработанное

«Допущено Министерством высшего и среднего специального образования СССР в качестве учебника для высших учебных заведений»

ИЗДАТЕЛЬСТВО
«ВЫСШАЯ ШКОЛА»
Москва — 1970

Foreword

In view of the arms race and the aggressive policy of the imperialist states, the Communist Party and the Soviet government have worked relentlessly to strengthen the defense capabilities of our country and to improve civil defense.

Civil defense is a system of national defense measures directed toward protecting the population, creating necessary conditions for maintaining operational stability of the national economy in wartime, and, if the enemy uses weapons of mass destruction, performing rescue and urgent emergency-restoration work.

In view of the above, the fundamental responsibilities of higher educational institutions [see note *] with regard to their "Civil Defense" courses are [1] to train students—the future specialists—in methods of protection against weapons of mass destruction, [2] to implement practical civil defense measures to be taken both in peacetime and in wartime at national economic installations, and [3] to train students as formation commanders, depending on the type of training [at these institutions of higher learning].

The present textbook is written in conjunction with a program for training students in institutes of higher learning through a course in "civil defense" and is intended for Soviet students of engineering-technological and liberal arts institutions. In addition, it may also be used by students of other institutions of higher learning in a general course on this subject.

The following civil defense instructors participated in the preparation of this textbook: P. T. Yegorov, professor and candidate [see note †] of military sciences [Chaps. 1, 2 (Sects. 1 and 2), 6, 8, and 11] and I. A. Shlyakhov [Chap. 2 (Sects. 3 and 4), 3, 4, 5, 9, and 10]—both instructors at the Moscow Highway Institute—and N. I. Alabin (Chaps.

[* An institution of higher education is any institute or technical school or trade school above the high school level, with the exception of the university, which is not included in this category.]

[† The "candidate" degree is equivalent to a high-ranking scientific degree, but is not given by a university or college, but by an institute—primarily a research institute or an institute of specialized training. Many people have both a university degree and a candidate degree.]

7 and 12), docent of the Moscow Technical Institute of Light Industry and Candidate of Military Sciences. G. A. Karpov, section chief of the Ministry of Higher and Secondary Specialized Education of the USSR, was responsible for overall supervision.

Russian rehearsal for Lenin's war of Communist revolution.

Introduction

The Communist Party of the Soviet Union and the Soviet government, rigidly adhering to Leninist principles of peaceful coexistence with states of a different social structure, have done everything possible to maintain peace.

The policy of peace conducted by the Soviet Union is determined by the socialist character of our country. Since an integral part of the struggle is to strengthen universal peace and international security, the Soviet government has introduced a broad and workable disarmament program. However, in contrast to the approach of the Soviet Union and other socialist countries of solving international problems by peaceful means, the aggressive imperialist circles seek to increase international tensions. The ruling circles of the USA are conducting an especially aggressive policy.

The United States of America not only maintains an enormous army itself, but also forces its allies in the aggressive blocs to spend a large portion of their budgets in preparing for a new world war. The USA has enmeshed the entire capitalist world in a net of aggressive military alliances—NATO, CENTO, AND SEATO—designed to subject the people of these allied countries to US influence and use them in the interests of aggression, especially against the Soviet Union and other socialist countries.

As pointed out by the 23rd Congress of the CPSU [Communist Party of the Soviet Union], the past few years have been characterized by an increase in imperialist aggression and reactionary activity. The deepening crisis of capitalism and the accentuation of its contradictions have strengthened imperialist adventurism and increased its danger to the people, to the cause of peace, and to social progress. The imperialist aggressors have been escalating their subversive activities against socialist countries and states that have taken the path of non-capitalist development.

United States imperialists, having assumed the role of world policeman, are the major reactionary force at the present time. The US aggressors are conducting a criminal war against the Vietnamese people and are crudely interfering in the internal affairs of many countries and peoples of Africa, Asia, and Latin America. The alliance between the

USA and the Federal Republic of Germany is extremely dangerous to the cause of peace. The imperialist predators are achieving militarization of the economy on a gigantic scale and are preparing for thermonuclear war via the armaments race.

On the basis of a profound Marxist analysis of contemporary international conditions, the Communist Party of the Soviet Union has concluded that the danger of attack by imperialists on the USSR and other socialist countries is currently increasing, and the countries of the socialist bloc must play a basic role in defending the peace. "Thus," as stated in the summary report of the 23rd Party Congress of the CPSU Central Committee, "the Communist Party of the USSR will make tireless efforts to strengthen the defense capabilities of our nation and to consolidate our military alliances with other socialist countries. Our Party sees its duty as one of maintaining a high level of vigilance on the part of the Soviet people against the intrigues of the enemies of peace and it will do everything possible, if an aggressor attempts to disrupt the peace, to prevent being taken by surprise, and to ensure that retribution will inevitably and without delay overtake the enemy."*

To these ends, our glorious armed forces have been equipped and will continue to be equipped at a high scientific and technical level, and will maintain their high degree of readiness in order to restrain any aggressor. Considerable attention is also being devoted to improving civil defense, which is of continually increasing importance.

---

* Summary Report of the 23rd Party Congress, L. I. Brezhnev, *Pravda*, 30 March 1966.

The presence of apertures in walls (windows, doors) has an influence on the destruction of buildings and structures since the wave, easily destroying them, penetrates quickly into the building, and the reflected pressure [outside] is compensated by the overpressure within.

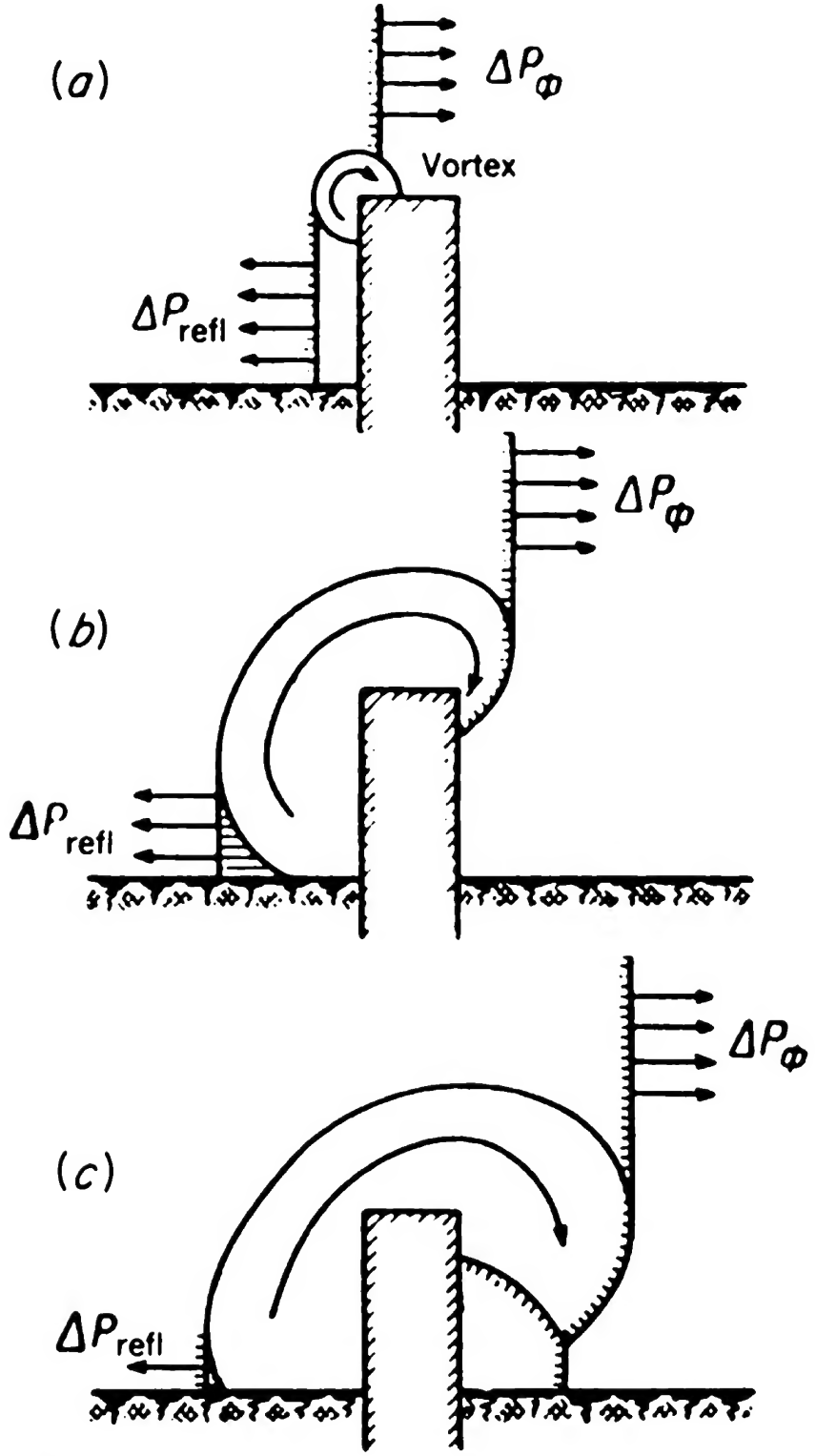


Fig. 15. A blast wave engulfing a vertical obstacle. (a) The front reaches the obstacle and exerts full reflected pressure; (b) the front passes by the obstacle and partially exerts reflected pressure; (c) the effect of reflected pressure ceases, but behind the obstacle the blast wave is reflected from the earth's surface.

As an example, let us examine the regularity in the drop of the radiation level. When measured 1 hr after the blast, the radiation level was 1000 r; after 1 hr, 1000 r/hr; after 7 hrs, 100 r/hr; after 2 days, 10r/hr; after 2 weeks, 1r/hr. Thus, two weeks are required for the radiation level to decrease from 1000 to 1 r/hr. However, this law of decreasing radioactive levels permits me to determine the radiation level at specific times (when it is increased by a factor of seven). Table 9 shows the radiation level at varying times after the blast.

Damage from radioactive materials involves two factors: contamination and human exposure. Within the contaminated area, people are exposed to gamma rays and contamination from radioactive materials settling on clothing and skin (external contamination) and also to radioactive materials which enter the body by ingestion of food and drink (internal contamination). Human contamination by radioactive material, as well as a prolonged residence time in a contaminated area, produces an exposure which may cause radiation sickness. Exposure doses causing radiation sickness are the same as those for initial nuclear radiation: a single dose greater than 50 r is considered dangerous.

To protect people from radioactive contamination, hermetically sealed blast shelters and fallout shelters are built and equipped with filter systems.

Industrial buildings which will not interrupt their production activities under the threat of attack are built to guarantee partial sealing in the case of contamination of the area and the air, considering the attenuation factor for fallout radiation of buildings and structures.

Individual protective devices are used to protect people from radioactive materials (gas masks, protective clothing), and the safe exposure period is monitored in a contaminated area to be sure that the dose does not exceed 50 r. After leaving the radioactive zone, it is necessary to remove the radioactive materials deposited on clothing and the skin, that is, to proceed with sanitary measures and decontamination of clothing.

Table 9.

Time after blast	Dose rate (R/hr)																				
30 min	2.3	4.5	9.1	13	18	23	45	68	91	114	136	182	227	456	546	681	908	1140			
1 hr	1.0	2.0	4.0	6.0	8.0	10	20	30	40	50	60	80	100	200	240	300	400	500	600	800	1000
1.5 hr	0.6	1.2	2.4	3.7	4.9	6.1	12	18	24	31	37	48	61	122	146	183	244	305	366	468	610
2 hr	0.4	0.9	1.8	2.6	3.5	4.4	8.7	13	18	22	26	35	44	87	105	131	175	219	266	350	437
3 hr	0.3	0.5	1.1	1.6	2.1	2.7	5.4	8.0	11	13	16	21	27	54	64.4	80	107	134	161	214	268
5 hr		0.3	0.6	0.9	1.2	1.5	2.9	4.4	5.8	7.3	8.7	12	15	29	35	44	58	73	87	116	145
7 hr			0.4	0.6	0.8	1.0	1.9	2.9	3.9	4.9	5.8	8	10	19	23	29	39	49	58	78	97
10 hr				0.4	0.5	0.6	1.3	1.9	2.5	3.2	3.8	5.1	6.4	13	15.4	19	25	32	38	51	64
15 hr					0.3	0.4	0.8	1.2	1.6	1.9	2.3	3.2	3.9	7.8	9.5	12	16	19	23	31	39
1 day							0.5	0.7	0.9	1.2	1.3	1.8	2.3	4.5	5.4	6.8	9.0	12	13	18	23
1.5 days							0.3	0.4	0.6	0.7	0.9	1.2	1.5	2.9	3.5	4.4	5.8	7.3	8.7	12	15
2 days									0.4	0.5	0.6	0.8	1.0	1.9	2.3	2.9	3.9	4.9	5.8	7.8	10
4 days												0.3	0.4	0.8	1.0	1.3	1.7	2.1	2.5	3.3	4.2
1 week														0.5	0.6	0.7	0.9	1.2	1.4	1.8	2.3
2 weeks																	0.3	0.4	0.5	0.6	0.8
4 weeks																				0.3	0.4

2.1.3 Secondary Damaging Effects. The damaging effects of a nuclear blast cause destruction and fires, which in turn may cause secondary damage; [for example] initial nuclear radiation generates electromagnetic waves which affect electronic instruments.

If petroleum-extracting and -refining equipment is damaged, fires and explosions are caused on a scale which may exceed the immediate effect of the nuclear blast. Damaged chemical plants may cause local contamination, while destruction of a hydraulic installation may cause flooding of populated areas.

In addition, nuclear blasts create electromagnetic fields, which generate surges in underground lines and in high-wire lines and radio station antennas, and also generate radio waves propagated over a wide area. The induced current and voltage may be propagated by wires over a wide area and cause damage to insulation, electrical and radio equipment may burn out, and personal injuries may occur. It is necessary to implement engineering technical measures in civil defense in order to provide protection from secondary damage.

2.2 Areas of Nuclear Damage and Zones of Radioactive Contamination

An area of nuclear destruction is an area subjected to the direct effect of a nuclear blast. The boundary of such as area is arbitrarily defined as the line where the overpressure of the blast wave reaches 0.1 kg/cm² [~ 1.5 psi]. To determine the possible nature of the destruction and also the necessary amount of rescue and emergency restoration work, an area of nuclear destruction is divided into four zones (Fig. 21).

The zone of complete destruction is characterized by an overpressure exceeding 0.5 kg/cm² [~ 7 psi] in the blast wave front. In this zone, residential and industrial buildings are completely destroyed; fallout shelters and some of the blast shelters located near ground zero are also

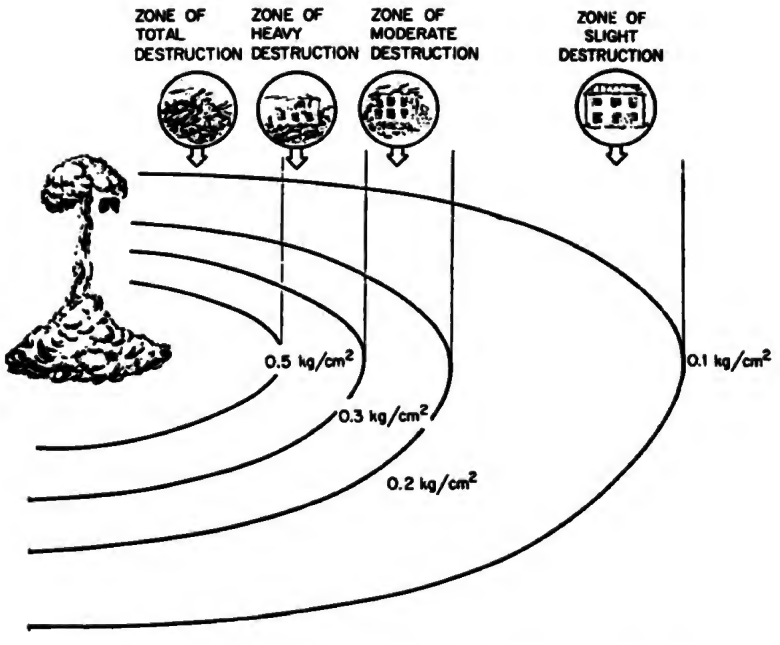


Fig. 21. Zones in an area of nuclear destruction.

destroyed. The majority of the blast shelters (up to 75%) and underground utility lines (up to 95%) remain undamaged. The streets are completely clogged due to the destruction of buildings. Entrances and exits of built-up shelters are blocked. Fires do not occur in zones of complete destruction; flames due to thermal radiation are prevented, because rubble is scattered and covers the burning structures. As a result the rubble only smolders, and fires as such do not occur. In zones of complete destruction, rescue work is carried out under complex conditions and involves clearing away the rubble, rescuing people from obstructed shelters, and particularly supplying air to shelters in which the filtering system has been destroyed.

A zone of heavy destruction is one in which the overpressure in a blast wave front amounts to 0.5 to 0.3 kg/cm^2 [7 to 4 psi]. In this zone the buildings and structures sustain heavy damage, but the shelters and the power lines remain intact. The majority of basement-type fallout shelters are also undamaged. A layer of rubble is formed as a result of damaged buildings. Conflagrations result from thermal radiation. The basic rescue work in this zone consists of clearing away the rubble, fire-fighting, and rescuing people from blocked blast shelters and fallout shelters and from destroyed and burning buildings.

The zone of moderate destruction is characterized by an overpressure in a blast wave front from 0.3 to 0.2 kg/cm^2 [4 to 3 psi]. In this zone, the buildings sustain moderate damage, while blast shelters and fallout shelters are completely undamaged. Local rubble is produced as a result of destroyed buildings. Conflagrations result from thermal radiation. The basic rescue work in this zone consists of firefighting and rescuing people from the rubble of destroyed and burning buildings.

The zone of slight destruction is characterized by an overpressure of 0.2 to 0.1 kg/cm^2 [3 to 1½ psi]. In this zone buildings sustain slight damage (partitions, doors, and windows are damaged); as a result isolated rubble may be present. Isolated fires may occur due to thermal radiation. The basic rescue work in this zone is to extinguish fires and rescue people from partially destroyed and burning buildings.

Beyond the zone of slight destruction, the shock wave is practically harmless to unprotected people. Buildings may undergo insignificant damage (damage to glass, roofs, and door and window frames). In addition, isolated fires may arise. People may experience slight injuries. Beyond the zone of slight destruction, people are able to aid the injured and clear away the damage without assistance.

The area of destruction may be thought of as a circle and [its area] is calculated according to the formula

$$A = \pi R^2,$$

where R is the radius of destruction with an overpressure of 0.1 kg/cm^2 [1.5 psi], determined according to Table 4, or calculated.

Example: The radius of destruction (0.1 kg/cm^2 [1.5 psi] of a 10

megaton nuclear weapon equals 25 km. We need to determine the area of destruction.

Solution:

Area of destruction $= \pi R^2 = 3.14 \cdot 25^2 = 1962.5$ km^2.

The area of the zone of nuclear destruction is determined according to the formula:

zone of complete destruction (area of a circle)

$$A_1 = \pi R_1^2;$$

zone of heavy destruction (area of a ring)

$$A_2 = \pi(R_2^2 - R_1^2);$$

zone of moderate damage (area of a ring)

$$A_3 = \pi(R_3^2 - R_2^2);$$

zone of slight damage (area of a ring)

$$A_4 = \pi(R_4^2 - R_3^2).$$

The radius in which injury of people and destruction of buildings occur from the blast wave of a nuclear explosion may be determined with the aid of tables and graphs, as well as by the law of similarity of explosions.

2.2.1 Law of Similarity of Explosions. As theoretical studies have shown, the radii of the zones of destruction and damage from a blast wave of nuclear and thermonuclear explosions of different force are proportional to the cube root of the ratio of TNT equivalents. Thus, for an approximate comparison of the radii of zones of destruction of a shock wave from nuclear blasts of varying powers, we may use the formula

$$\frac{R_2}{R_1} = \sqrt[3]{\frac{q_2}{q_1}},$$

where R_1 and R_2 are the radii of the zones of destruction in meters and q_1 and q_2 are the TNT equivalents in kilotons.

Example: The radius of slight damage in an air burst with a power of 20 kilotons is 3200 m. To determine the radius of destruction of a nuclear blast with a power of 10 megatons, substitute the known values in the formula referred to above:

$$R_2 = R_1 \sqrt[3]{\frac{q_2}{q_1}} = 3.2 \sqrt[3]{\frac{10{,}000{,}000}{20{,}000}} \cong 25 \text{ km [15 miles]}.$$

Toxic materials have definite physicochemical and toxic properties, a knowledge of which allows a more rational organization of chemical warfare protection of the population. Such properties as boiling and freezing points, volatility, specific gravity, solubility, and viscosity are of great practical importance. Knowledge of a given TM's boiling point, viscosity, and volatility make it possible to determine approximately how long that TM will survive at a certain place, that is, how long contamination will last. Solubility and specific gravity can be used to judge the degree of contamination of a liquid and the possibility of washing the TM from contaminated surfaces.

A knowledge of the chemical properties of poisonous substances makes it possible to select the means and methods for detecting (indicating) and decontaminating (neutralizing) TM. The properties of toxic materials are generally dividied into groups for study according to functional stability relative to maintaining their toxic effects and the nature of the effect on the human organism. In the armies of capitalist countries, TM are arbitrarily divided into persistent and nonpersistent.

The *persistence* of a TM is its power to retain its harmful effect for a determined period of time after it is used; this depends on the physical and chemical properties of the TM, the method with which it was applied, meteorological conditions, and the character of the territory where it was released. Persistent toxic materials retain their harmful effect for a few hours up to several days or even weeks. They are modified little by air and humidity and evaporate very slowly. Nonpersistent toxic materials maintain their harmful effects on open terrain for several minutes and in sites of stagnant air (in basements, closed premises, ravines, etc.) for 10 min up to an hour and more.

2.3.2 Characteristics of Basic Toxic Materials. Toxic materials are divided into four groups according to the nature of the effect (toxic effect) on human organs: nerve-paralysis, skin abscesses, general toxicity, and suffocation. The TM classifications used in the armies of capitalist countries are shown in Table 10. The basic properties of the toxic materials indicated above are given in Appendix I.

In the US, work is being carried out on a new type of TM, which is called the psychochemical TM. Only small doses (less than 0.001 mg) of these TM are required to incapacitate a human. The effect of the psychochemical TM on people is not fatal, but only affects the mind. People exposed to these TM become incapable of working for a period of

Table 10.

Name of TM	Toxic effect	Stability
Sarin	Nerve paralysis	STM
Soman	Nerve paralysis	
V gases	Nerve paralysis	
Mustard gas	Skin irritant	
Prussic acid	General toxicity	UTM
Phosgene	Suffocation	

time and lose their self-control. When psychochemical TM's are used, for example, diethylamides of lysergic acid, intoxication, depression, and hallucinations begin after about 30 min. The effect of this TM lasts from 0.5 to 12 hrs (Rothschild, *Tomorrow's Weapons,* Moscow, Voyenizdat, 1966) [see footnote*].

Tremorine and psilocybin have been described in the foreign press under the title "fear gases." When the effect of these TM was demonstrated in a cat which had inhaled the particular agent, it ran away from a mouse. In addition to the enumerated substances, in capitalist countries there is a TM with a lacrimatory and an irritant action which is used to combat demonstrations and in colonial wars (USA in Vietnam).

2.3.3 Methods for Applying Toxic Materials. To contaminate national economic installations, and populated areas, the enemy may apply poisonous substances with the aid of bombers (bombs, AST), rockets, and blimps. The bombers of the USA have aerial chemical bombs in their armaments (ACB) as well as aircraft spray tanks. The size of US airborne bombs ranges from 4.5 to 450 kg and larger (Fig. 24). Depending on the type of fuse, aerial chemical bombs may be of the contact or noncontact type. The former explode upon contact with the ground or with other objects; the latter may explode at a preset altitude.

Chemical bombs may contain persistent as well as nonpersistent TM. Bombs armed with nonpersistent toxic materials are intended to injure people and contaminate the air; they are equipped with contact fuses. They explode when they strike the ground (or another target) and form a cloud of TM, which is dispersed by the wind over great distances.

Bombs with nonpersistent TM are usually large, 250 to 1000 kg [550–2200 lb], and produce a high concentration of toxic materials

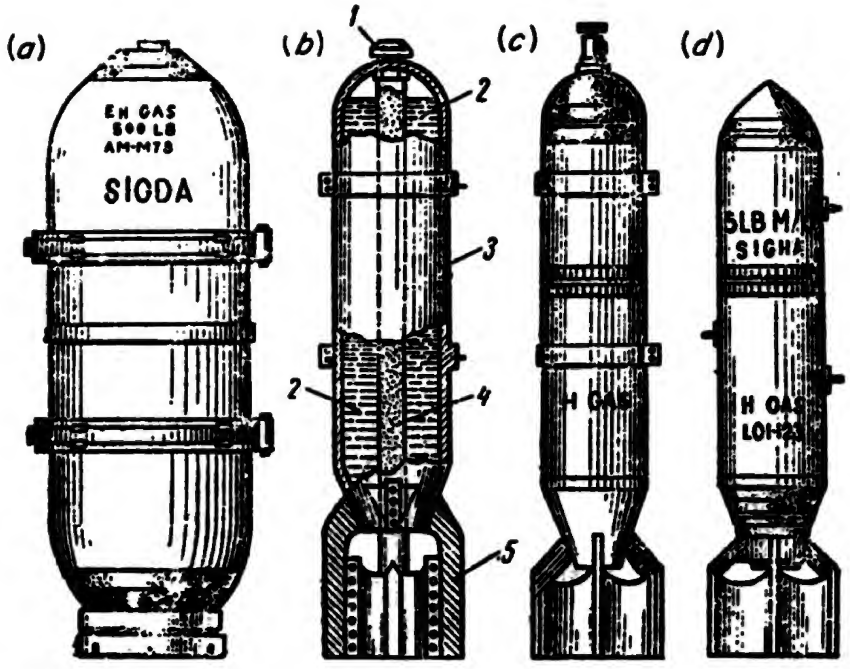


Fig. 24. Aerial chemical bombs: (a) Bombs armed with persistent TM; (b,c,d) bombs armed with nonpersistent TM. 1, fuse; 2, toxic material; 3, shell; 4, explosive; 5, stabilizer.

* [In the US, *Tomorrow's Weapons,* by J. H. Rothschild, McGraw-Hill, 1964.]

over a considerable area at the moment of explosion. For example, a 250-kg US bomb armed with phosgene forms a cloud of contaminated air with a diameter of up to 50 m and a height of up to 10 m, with a very high TM concentration; the cloud is propagated by the wind at a dangerous concentration over a considerable distance; the crater usually retains an accumulation of incompletely vaporized TM, the vaporization of which may continue for an hour or more.

Bombs armed with persistent TM are intended to injure people as well as to contaminate the area and targets. Depending on the targets selected by the enemy, remote action bombs may be used. These bombs may be detonated at an altitude of 50 to 200 m, and the toxin will settle on the ground in the form of rain, contaminating the area and targets as well as the population. The size of the contaminated area depends on the size of the bomb, the quantity and quality of the TM, the altitude of the blast, and wind velocity. The size of such bombs may be 100 to 1000 kg. When a 250-kg bomb explodes at an altitude of 100 m, an area of about 5000 m^2 is contaminated with a TM density of 10 to 15 g/cm^2.

Aircraft spray tanks (Fig. 25) are thin-walled metal containers with a streamlined shape and a capacity of up to several hundred liters. Two to four, depending on the carrying capacity of the airplane and the capacity of the containers, are mounted under the wings or under the fuselage of aircraft. There cannisters contain TM which discharges from the container as soon as it is dropped and settles on the ground in droplet form; it contaminates the earth and injures unprotected personnel in the area.

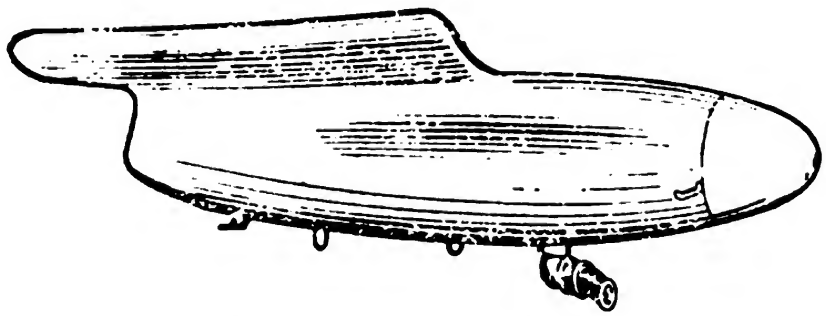


Fig. 25. Aircraft spray tanks (AST).

The size of the contaminated area when aircraft spray tanks are used depends on the altitude and the flying speed of the aircraft, the duration of spraying, the amount of TM dispensed, and the wind velocity and direction.

Rockets, including ballistic missiles, may be used to apply toxic materials. The special features of this method of attack are the range of delivery and the surprise factor, in addition to which "one large rocket with TM can affect 30% of the people located in an area of about three square kilometers" (Rothschild, *Tomorrow's Weapons*). [See footnote on page 61].

2.3.4 Danger Areas of Chemical Contamination. A *danger area of chemical contamination* is an area subjected to the effects of TM, as a result of which people and animals may be injured. The size of the dan-

ger area of chemical contamination depends on the quantity of TM used, the type, the meteorological conditions, and the relief of the terrain.

Persistent TM may be used to form a danger area of chemical contamination. Such an area is capable of sustaining its harmful effect for an extended period of time. The possibility of contaminating an area from the air and consequently creating a danger area of chemical contamination is determined by US specialists according to the lifting capacity of the aircraft. By their calculations, one aircraft carrying about 7 tons of chemical bombs armed with toxic materials with a nerve-paralyzing effect can create a lethal concentration of TM in an area of 250 km^2 [96 square miles].

If aircraft spray equipment is used, a low-flying plane at a speed of 480 km/hr equipped with two 30-gal (136.5-liter) aircraft spray tanks can contaminate a strip 270 to 360 m long (*Collier's,* September 27, 1953; *Passive Defense,* Washington, 1957).* The width of the contaminated strip in this case depends on the wind (its velocity and direction) and on the altitude at which the TM was dispensed. Thus, US aviation has the means to create danger areas of chemical contamination. These danger area will be characterized by massive injury to unprotected people and animals due to contamination by toxic materials of objects, buildings, equipment, transportation, water sources, reservoirs, food supplies, and forage.

Vapors and aerosols are formed when the chemical weapon explodes; the TM's contaminate the air and create a so-called "primary cloud" of contaminated air, which, propagated in the direction of the wind, is capable of injuring people in an area several times larger than the area directly affected by chemical weapons.

When the chemical weapon explodes, some of the TM settles on the ground and on objects in the form of drops (fogging) and when these evaporate a "secondary cloud" of contaminated air is formed which moves in the wind direction and can also cause injury to people. Consequently, a danger area of chemical contamination includes territory which is affected directly by dispersion of TM from weapons and also the territory on which TM vapor is dispersed in combat concentrations, that is, concentrations capable of causing injury to people.

The configuration and size of a danger area of chemical contamination depends on the type of TM substance, the type and quantity of the means of delivery, meteorological conditions, and the character of the terrain. This danger area can be divided into two zones: I, the zone directly contaminated by TM, and II, the zone into which TM vapors and aerosols are dispersed (Fig. 26). The size of zone II, that is, the zone into which TM vapors are dispersed, exceeds zone I by several times, especially for such TM as sarin and soman. If there is an inversion (and other favorable conditions for using TM), a dangerous concentra-

[* *Collier's* reference not verified; *Passive Defense* may refer to publication by US Bureau of Naval Personnel.]

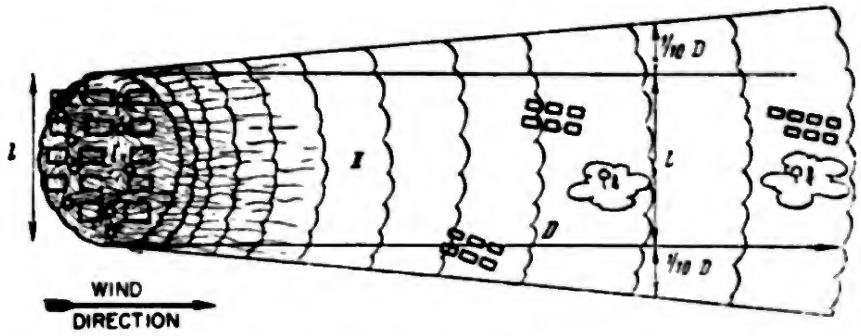


Fig. 26. Danger area of chemical contamination: D = length of TM propagation zone; l = width of the zone of direct contamination.

tion of sarin can be propagated for a distance of 15 to 20 km [9–12 miles].

In the case of chemical attack and formation of danger areas of chemical contamination, the basic conditions for guaranteeing functional stability of industrial plants would be to carefully seal production buildings and technological processes and to provide the workers with individual means of protection.

2.3.5 Influence of Meteorological Conditions and Topography on a Danger Area of Chemical Contamination. Meteorological conditions, the relief of the terrain, and the building density have a great influence on the condition of an area of chemical contamination. The temperature and the wind have an important influence on the evaporation rate of TM. When there is intense heating on the earth's surface and a low layer of air, mixing of the lower and upper atmospheric layers occurs and causes rapid dispersion of TM, which evaporates from the ground and objects, while the wind facilitates scattering of these vapors.

At low winter temperatures, TM evaporation will be insignificant; thus, contamination of terrain and installations will be more extensive. The vertical stability of the lower atmospheric layers influences the propagation velocity and the area of the TM vapors and thus the size of the secondary danger area of chemical contamination.

It is possible to distinguish three levels of stability in the surface layer of air: the first level *is inversion* (at which the lower layer of air is cooler than the upper); the second level is *isothermal condition* (characterized by the fact that the air temperature within 20 to 30 m from the ground is nearly uniform); the third level is *convection,* when the lower air layer is warmer than the upper layer and vertical mixing occurs. Inversions and isotherms contribute to maintaining a high TM concentration in the surface air layer; they facilitate the dispersal of contaminated air great distances from the contaminated area. Convection causes rapid dispersal of contaminated air, and air concentrations of TM vapors decrease rapidly.

The wind velocity influences the atmospheric TM concentration. With a gentle wind, contaminated air is dispersed slowly, and high concentrations are sustained longer; strong, gusty winds rapidly disperse the contaminated air. With an increase of wind velocity, the TM evaporated

from the contaminated area also increases. Heavy rainfall washes the toxic materials from the soil and also lowers the contamination density in the area. Vegetation (underbrush, forests, thick grass), building density, and the relief of the terrain (ravines, gullies) facilitate stagnation of contaminated air and increase the duration of contamination of an area.

2.4 Biological Weapons

2.4.1 Concepts Concerning Pathogenic Microbes and Toxins. A *biological weapon* is a pathogenic microbe or toxin intended to injure people, animals, plants, and food supplies, as well as the means with which these are applied. The basis of the biological weapon is the pathogenic microbe and the toxins which are produced by some microbes. The concept "biological weapon" can be much wider, including not only pathogenic microbes and toxins but also their carriers (insects, ticks, rodents), agricultural pests, and other biological agents.

Depending on their structure and biological characteristics, microbes are classified into bacteria, viruses, rickettsia, and fungi. Bacteria are microorganisms of the plant kingdom, primarily unicellular, visible only under a microscope. Their size ranges from 0.5 to 5 μ [microns]. Under favorable conditions they multiply by simple division very rapidly—every 20 to 30 min.

Bacteria are rapidly destroyed by sun rays, disinfectants, and boiling. Some forms of bacteria (anthrax, tetanus) are transformed into spores with great stability to the above-mentioned agents. Bacteria are resistant to low temperatures and freezing. Bacteria cause diseases such as bubonic plague, chlorera, anthrax, etc.

Viruses are the smallest organisms, a hundred thousand times smaller than bacteria, and they can be detected only with the aid of an electron-microscope. Unlike bacteria, viruses multiply only in live tissue. They are resistant to drying and freezing. Viruses are responsible for smallpox, yellow fever, etc.

In size and shape, *rickettsia* approximate some bacteria, but they reproduce and survive only in infected tissue. Rickettsia cause typhus, Q fever, and other diseases.

Fungi, just as bacteria, are in the plant kingdom, but have a more highly developed structure. The resistance of fungi to the effects of physicochemical factors is much higher; they are resistant to desiccation and sunlight.

Toxins are highly active poisons produced by some microbes, for example, by the organisms of botulism, tetanus, and diptheria. The toxins of these microbes are extremely potent and cause serious poisoning. In their desiccated form, the toxins retain their potency for many weeks and even months. About a thousand pathogenic microbes are presently known which cause damage to people, animals, and plants. But according to information of the foreign press, not all of them can be used in a war in the capacity of biological weapons.

American specialists have selected the following pathogens to strike humans in a biological war:

1. Bubonic plague, malignant anthrax, melioidosis, brucellosis, tularemia, cholera;
2. Smallpox, equine encephalomyelytis, dengue fever, yellow fever, psittacosis;
3. Typhus, Q fever, Rocky Mountain spotted fever, tsutsugamushi disease;
4. Coccidial mycosis, nocardiosis, blastomycosis;
5. Botulism.

To strike animals, US specialists have selected the following pathogens: hoof-and-mouth disease, largehorn cattle plague, pig plague, African swine plague, malignant anthrax, glanders, brucellosis, etc. To destroy agricultural plants, they may use agents of wheat rust, rice [pyriculariosis], potato phytophthora, and other diseases.

The destructive force of biological weapons depends on a series of factors: the biological properties of the pathogens, the living conditions of the people, immunity of the population (resistance to infection), level of sanitary conditions of the population, state of preventive medical treatment and antiepidemic decontamination facilities, the season of the year, and other factors. The characteristics of the pathogenic microbes which may be used by the enemy are described in Appendix II.

If the enemy uses biological weapons to strike the population, the following may result: inhalation of contaminated air; use of contaminated products and water; bites by infected insects and mites; invasion of mucous membranes and injured skin by microbes and toxins; contact with contaminated objects; personal contact with infected people and animals. With contamination by biological means, sickness does not appear at once; there is almost always a latency (incubation) period during which the disease is asymptomatic and the infected person is not disabled. The duration of the incubation period depends on the agent, the microbial invasion of the organism, and the general physical condition of the host. The latency period may last from 1 day up to 2 to 3 weeks.

Some pathogens (plague, cholera, smallpox) can be transmitted from infected to healthy individuals and by spreading rapidly can cause epidemics. It is very difficult to prove that biological weapons are being used and to identify the pathogen. It is reported in the US press that no instruments currently exist with which it would be possible to determine when use of biological weapons was initiated. Thus, the basic method for determining the type of agent is analysis of specimens in the laboratory, which requires a great deal of time, sometimes as much as several days. All this makes it difficult to take the appropriate measures in time to forestall an epidemic.

2.4.2 Methods of Employing Biological Weapons. There are different ways and mechanisms to infect people by biological agents. The enemy might use biological weapons in different ways in any season or at any

time of the day. One of the most probable methods might be to contaminate the layers of the atmosphere near the ground with aerosols in the form of liquid or dry bacterial (viral, fungal, toxic) compounds.

Judging from the following considerations, the aerosol method is considered the most important by US specialists: With this method it is possible to contaminate large areas, measuring tens, hundreds, or thousands of [square] kilometers. In the absence of protective measures, the aerosol method makes it possible to infect everyone in the zone of application. In this case, due to a large dose of pathogens invading the organism through the respiratory organs and the skin, it is possible for people to be infected even though they would ordinarily be immune. In addition, this method makes it possible to disperse agents of almost all infectious diseases, even those which are not transmitted through the air under ordinary conditions (for example, brucellosis, typhus, yellow fever, etc.).

It must be kept in mind that with the use of biological weapons contamination of people and farm animals and surrounding objects through the air can occur not only at the moment of biological attack, but for a long time afterward, for several hours and sometimes days. The possibility of such contamination is explained by the fact that the pathogens may retain their viability for a long time in the soil, on vegetation, and on the surface of various objects, and, in addition, when picked up with dust, they may create so-called secondary bacterial aerosols which are no less dangerous than the primary ones.

Biological pathogens can be disseminated among the human population and animals not only by aerosols, but also by vectors: insects, mites, and rodents. These disease-carrying vectors of infectious diseases grow easily in large numbers; they are infected and continue to survive as carriers of pathogenic microbes for a long period of time, sustaining the pathogens in their organisms and transmitting them to people or animals. The life span of infected pathogenic vectors varies from several weeks (mosquitos, fleas, flies, lice) to several years (mites). Some vectors, mites for example, can transmit disease vectors to their progeny. These factors guarantee creation of persistent areas of contamination; this is also facilitated by the biological characteristics of insects and mites, wherein they are active in attacking people, animals, and rodents, and in contaminating food sources and surrounding objects. To apply these biological weapons, the enemy may use rockets (Fig. 27*a*), airborne bombs (Fig. 27*b*), artillery shells and mines (Fig. 27*c*), packets (bags, boxes, containers) thrown from airplanes (Fig. 27*d*), special equipment for spraying or vaporizing (Fig. 27*e*), and sabotage (Fig. 27*f*) for contaminating air, water, and places where people gather, contaminating animals, and disseminating infected insects and mites to contaminate the population and their food products.

2.4.3 Indications That Biological Weapons Have Been Used. Indications that biological weapons have been used are as follows: the appearance of streaks of smoke or fog in the wake of moving aircraft (Fig. 28*a*),

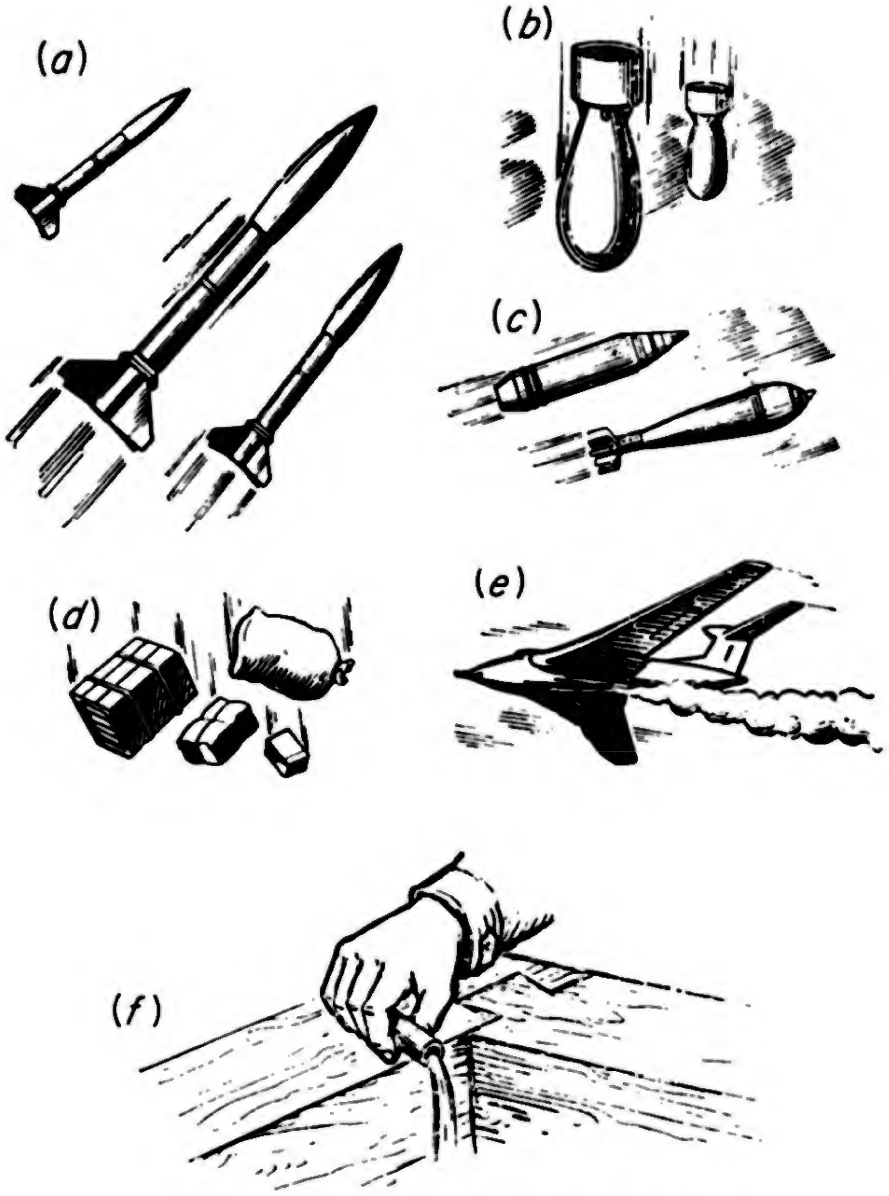


Fig. 27. Application of biological weapons.

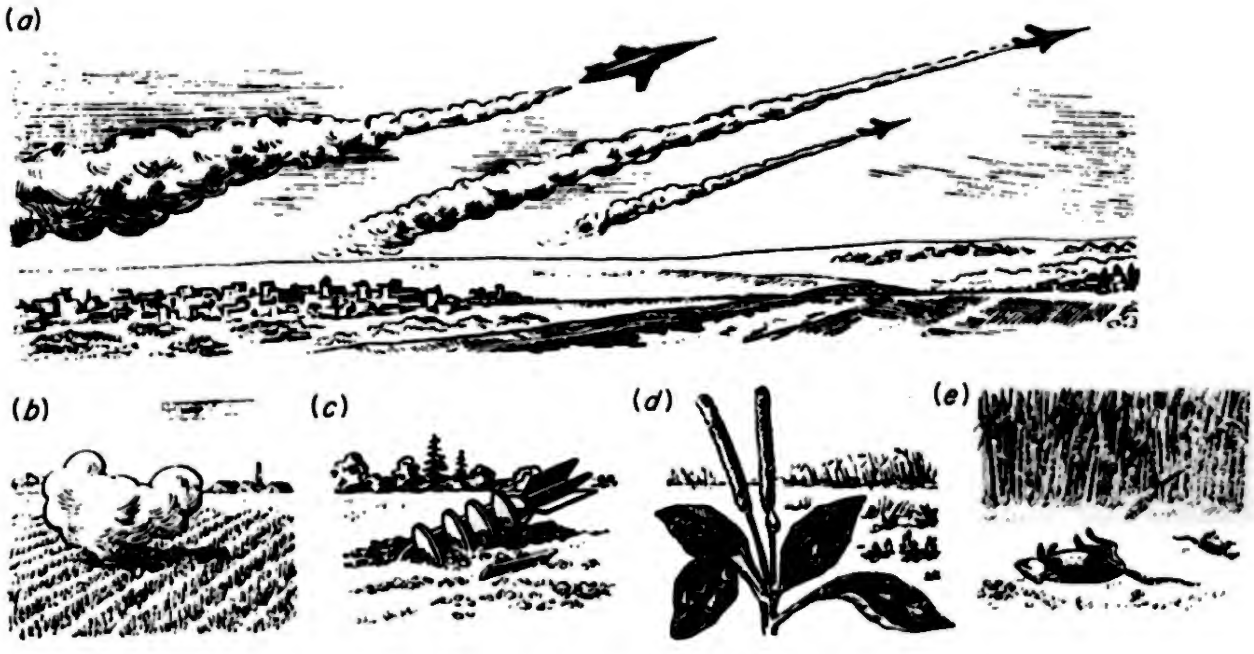


Fig. 28. Indications that biological weapons are being used.

a dull sound of the explosion of the microbe-carrying weapon (Fig. 28*b*), the presence on terrain of special aerial bombs, shells, or various containers (Fig. 28*c*), the appearance of drops of liquid or powdery substances on the soil or other objects (Fig. 28*d*), the appearance of hosts of insects, mites, or rodents—unusual for a given place or a given season (Fig. 28*e*), and the occurrence of epidemic diseases in people and animals.

Early detection of signs that the enemy has used biological weapons makes it possible in a short period of time to send qualified biological exploration teams to the contaminated region to determine the area of contaminated region to determine the area of contamination and the nature of the pathogens, to set up quarantines, if necessary, and take measures to control the effects of the attack.

2.4.4 Focal Areas of Biological Contamination. The focal area of biological contamination is a territory exposed to the direct effect of biological media, creating the danger of spreading infectious diseases. Such a focal area may be produced by the use of pathogenic microbes which induce infectious diseases or of toxins injurious to human beings.

According to foreign specialists, the use of biological media is contemplated on targets deep in enemy territory: large industrial and administrative centers, railroad junctions, sea and river ports, and on large agricultural tracts. The main danger of biological media used in war is the possibility of contaminating large territories. In their instructions in the use of chemical and biological weapons, the US Army FM-3 (1962) points out that "with the use of one airplane or rocket it is possible to contaminate thousands of square kilometers of enemy territory in effective concentrations."

Biological media are used on targets in the rear areas to disrupt mobilization measures in the initial period of a war and to hamper deployment of armed forces by destroying troop contingents designated for movement to the front, as well as by destroying the urban and rural population subject to conscription into the army; to disorganize the rear of the country by creating a large number of contaminated areas and disrupting the normal operation of industrial plants and other national economic sites; to reduce the war-economy potential and create difficulties in the country by widespread transmission of infectious diseases; to infect food supplies and forage; to destroy agricultural animals and crops.

The size of the focal area of biological contamination depends on the type of weapons, the bacteriological compounds, their number and means of delivery, as well as on meteorological conditions, on how quickly the infections are detected, and on how promptly preventive treatment is given and decontamination measures are taken.

When bacterial compounds are released in the air, a bacterial cloud is formed consisting of minute particles of the formulation mixed with air. This cloud, moving irregularly with the wind, may settle on the ground, into water, onto plants, and on all objects, as well as on human and animal skin. If contamination occurs via the air and a large quantity of

pathogens invade an organism, even inoculated people may be infected. Thus, a large number of people will require medical treatment in a hospital.

If biological media are applied by means of vectors, the size of the focal area of biological contamination is determined by the area where these disease carriers were dispersed. The special feature of this method of contamination is that insects and mites, as mentioned above, retain pathogens in their bodies from several weeks (fleas, mosquitos, and flies) to several years (mites).

Antiepidemic organizations of the CD medical service determine the size of the focal area of biological contamination, as determined by data from observation stations and reconnaissance teams and groups, as well as from meteorological and epidemiological public health stations. Whenever a focal area of biological contamination occurs, quarantine and observation are initiated by the CD chief of the area (republic, region).

One biowar hazard feared by Commies is tear-gas from onions. Sulfoxides in onion cells create propanethiol S-oxide, a gas that on contact with water (in eyes) gives eye watering sulphuric acid.

President Nixon had onion war banned.

Russian slave girl making tear gas from onions.

3. Methods of Protecting the Population by Dispersal and Evacuation

3.1 Organization and Planning of Dispersal and Evacuation

Should weapons of mass destruction be used, the enemy is planning its first nuclear missile attacks against major cities and industrial and administrative centers of defense importance. Industrial enterprises, transportation and communication centers, and other important objectives are usually concentrated in cities; at the same time, cities contain large populations that work in these enterprises and form the basis of productive capacity.

The fraction of the Soviet population living in cities is 55% (by 1967 data). Thus, the larger part of the population of our country lives in cities, many of which may become the targets of possible nuclear missile strikes.

Under these conditions, civil defense takes on an especially important character, since its principal task is the defense of the population from weapons of mass destruction and the defense and preservation of the productive capacities of the state. V. I. Lenin once stressed: "The primary productive factor of all of humanity is the laboring man, the worker. If he survives, we can save everything and restore everything . . . but we shall perish if we are not able to save him" (V. I. Lenin, *Collected Works,* Vol. 38, p. 359).

During the Great Patriotic War [World War II], to protect productive capacity, we transported entire enterprises, including their workers and employees, to the deep rear from areas of direct combat; that is, we evacuated industry. The evacuation of people, enterprises, and capital equipment was directed by the Soviet [Council] on Evacuation, which was organized by a decree of the CC of the CPSU and by the Council of People's Commissars of the 24th of June, 1941.

Under the direction of the government, all national departments and administrations organized special sections and commissions on evacuation. On-site, the evacuations were supervised by Party and Soviet organs. A priority system for evacuating enterprises, people and material goods was established.

The first enterprises to be evacuated were large ones with defense

significance. (The evacuation included workers, employees and their families, and factory equipment.) From July through November 1941, over 1000 industrial enterprises moved into the interior of the country. Evacuation from the forward areas of the Don Basin, Stalingrad, and the northern Caucasus was also conducted in the summer of 1942.

A characteristic feature of the evacuation of that time was that it took place over 1000 kms. from the front lines, into areas inaccessible—at the time—to enemy attack. However, this evacuation was only partial in character, since a significant part of the population remained in the territory occupied by the German-fascist invaders.

Under conditions of a nuclear missile war, civil defense must solve the problem of defending the population through a series of measures, which include dispersal and evacuation of people from cities that are likely to be targets of missile strikes by the enemy. Evacuation should be made to areas outside the metropolitan areas, and the evacuees must be sheltered there in protective structures and also given individual means of protection.

The outer zone [see *] in this case means the territory between the external border of the area of possible destruction of the city and the border of the region (area, republic). The boundaries of the zone of possible destruction are established on the basis of the importance of the city and the size of the population.

3.2 The Concept of Dispersal and Evacuation

Dispersal is the term used for an organized transport from the major cities and the distribution in the outer zone of workers and employees of national industrial enterprises that continue to function within these cities in wartime.

In addition to workers and employees of industrial enterprises, people who help operate the city should also be included in the category of those to be dispersed (for example, utility workers). These people must work within the city but return to the outer zone to rest.

Workers and employees of enterprises who are among those to be dispersed must, after relocation in the outer zone, go into the city in shifts for work at their enterprises and, upon completion of work, return to the outer zone to rest.

Evacuation refers to the removal from a large city to the outer zone of that portion of the population which does not work in industrial enterprises within the city, and also the removal of the inhabitants of a zone of possible flooding into safe areas.

Some city enterprises can also be evacuated, including organizations, offices, and educational institutions whose activities during the war period can be transferred to rural areas.

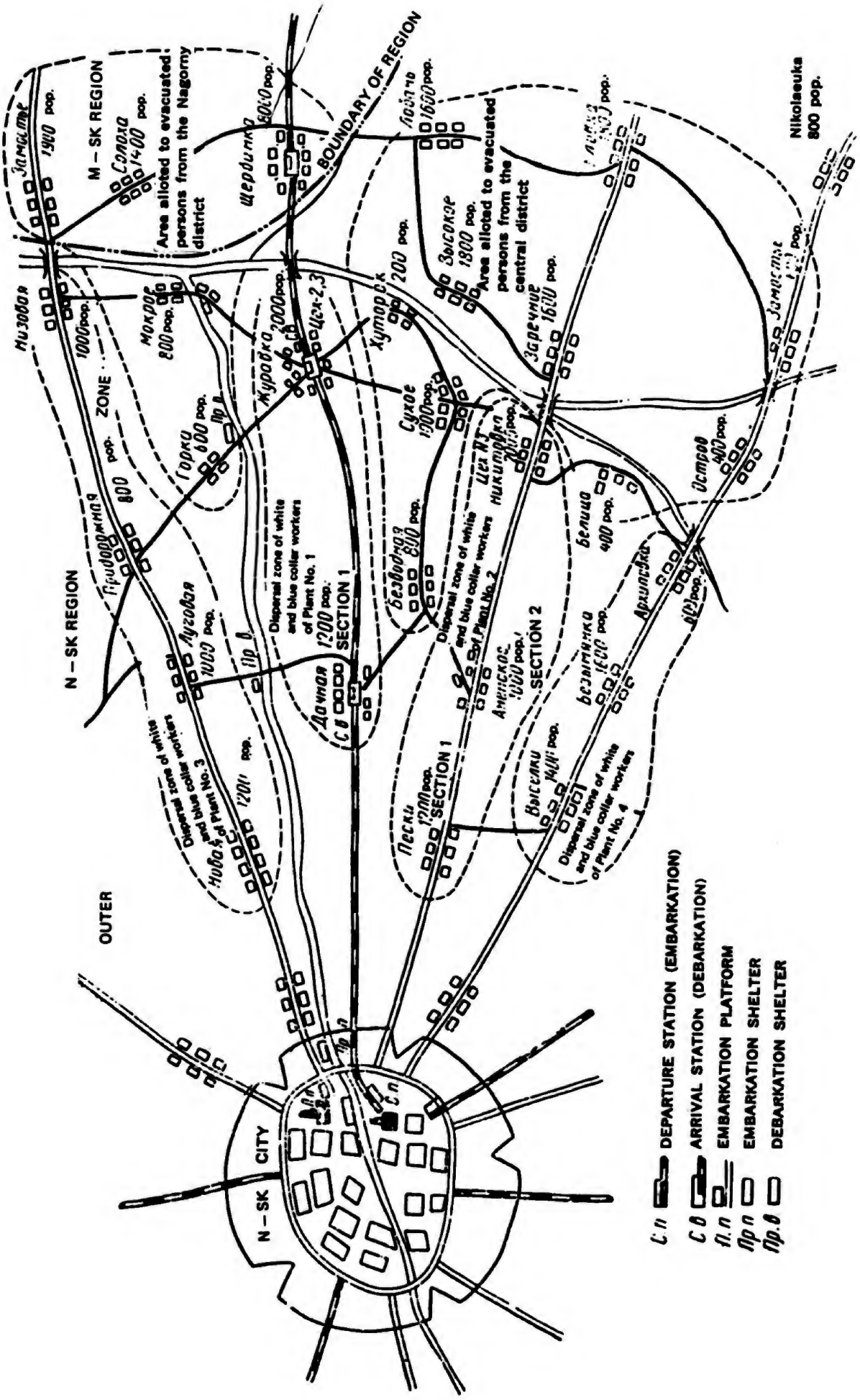


Fig. 29. Evacuation and dispersal areas.

In a state of rest and under normal meteorological conditions, a person requires 14.2 liters of oxygen per hour and exhales 11.8 liters of carbon dioxide. When inside the shelter, an increase in pulmonary ventilation is observed in humans, and the oxygen requirement increases up to 24 liters/hr, while the amount of carbon dioxide expired increases to 20 liters/hr. Because of this, the change in gaseous composition and heat-humidity conditions of the air in shelters is rather marked, and dealing with these changes presents great difficulty.

In unventilated shelters, the decisive parameter determining the condition of the occupants during their confinement in the shelter is the composition of the shelter air, since this becomes limiting before the heat-humidity conditions. If we assume that the shelter's volume per person is 1.3 to 1.5 m^3 [46 to 53 ft^3], the carbon dioxide concentration after 2 to 2.5 hr increases by 3–4%. Further confinement of the occupants to the unventilated shelter may result in serious consequences.

The time of increase in the carbon dioxide concentration up to critical values is determined according to the formula

$$t = \frac{C_{dop} V}{100B},$$

where C_{dop} is the limit concentration of carbon dioxide (%), V is the volume of the premises for one human being (m^3), and B is the amount of carbon dioxide expired by one adult (liters/hr).

In ventilated shelters the greatest difficulty is dealing with excess heat and humidity. When 2 m^3/hr [1.1 cfm] of ambient air is supplied per person, the concentration of carbon dioxide in the shelter does not exceed 1.5%. However, when air is admitted for 10 to 12 hr, the temperature in the shelter increases to 29 to 30°C [84 to 86°F], and conditions for those in the shelter deteriorate. Thus, the normal air supply must be increased 2 to 3 times [see note*] for extended confinement to the shelter.

Air supply in the shelters. As a rule, supply of ambient air to shelters must be ensured by two systems: by a clean ventilation system (primary system) and by a filter-ventilation system (secondary system). In shelters located in possible fire zones, it is also necessary to provide for a partial-insulation system, along with cleaning of the ambient air from combustion products during fires, and cooling of the air and regeneration of the internal air (tertiary system). The clean ventilation system purifies the ambient air of radioactive dusts, and the filter-ventilation system removes radioactive dust [and also] toxic materials and bacteriological agents. Ventilation system changeover is achieved by airtight valves and by activating existing fans.

[* This guidance is not consistent with the more realistic requirements stated in Table 16, which specify 20 m^3/hr (10.6 cfm) per person of outdoor air at 30°C (86°F).—US Ed.]

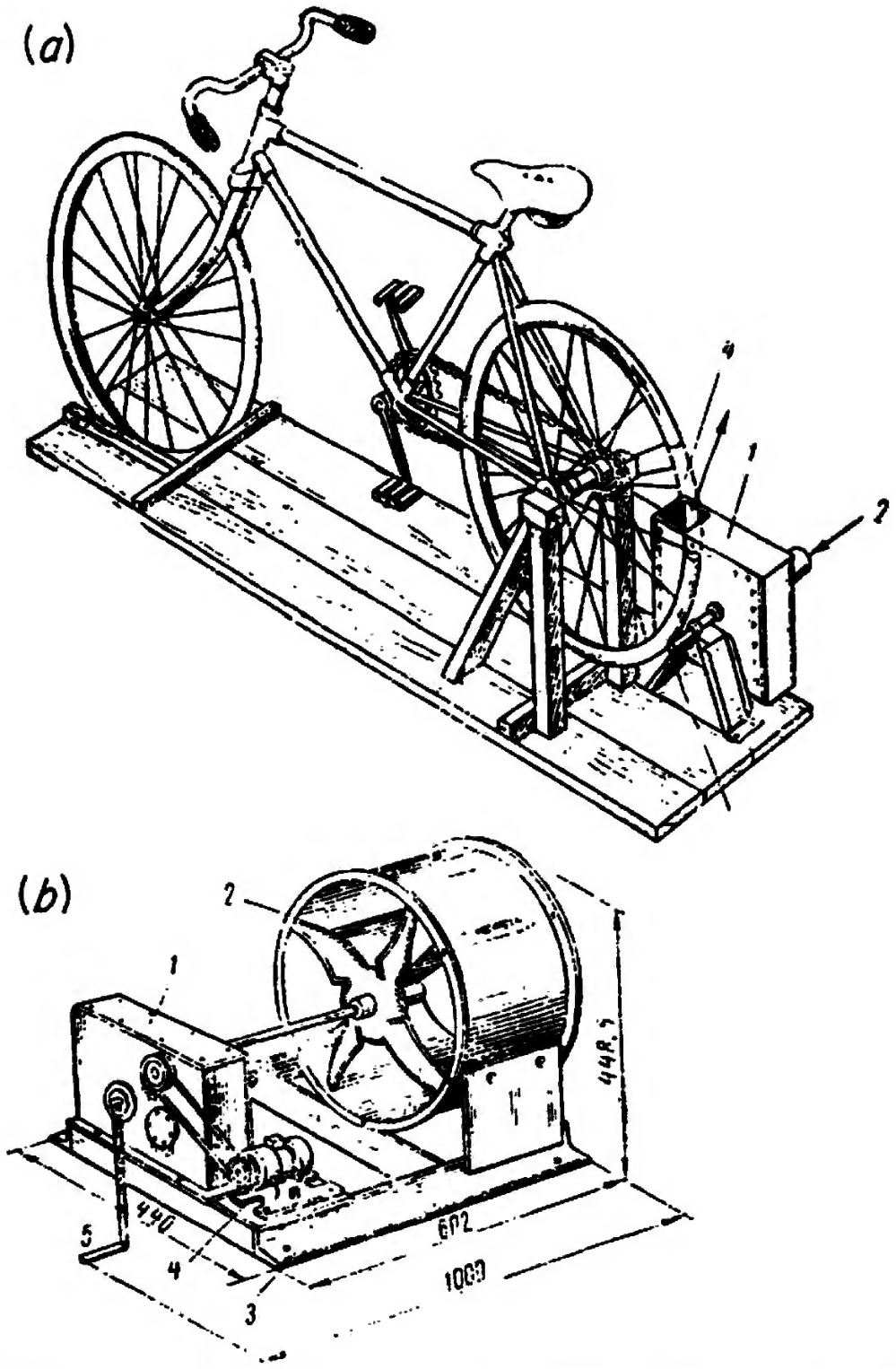


Fig. 60. Fans: (a) metal fan with bicycle-driven mechanism—(1) metal fan; (2) intake nozzle; (3) power drive shaft; (4) air outlet; (b) ROV axial ventilator—(1) reducer; (2) blade wheel; (3) support; (4) electric motor; (5) crank.

5.3 How to Arrange and Equip Fallout Shelters

In rural areas, protection of the population is ensured (1) by building fallout shelters and by adapting basements, cellars, and other underground structures as shelters in peacetime and (2) by building and adapting such structures when the threat of enemy attack is announced.

Fire prevention. Fire-preventive measures at a national economic facility increase protection from fires and prevent fire spread. For these purposes, new industrial buildings and structures are built of fire-resistant materials. Fire breaks are provided between the buildings, and there are a sufficient number of exits from the industrial plant site. These measures permit free movement for the fire department.

Measures to prevent fires in buildings and structures include fire-resistant construction, fire-retardant treatment of combustible building elements, and special firewalls. In stone buildings, the ceilings are made of reinforced concrete and concrete slabs. Large buildings are made in sections wih nonflammable walls (fire walls). These walls, which run through the attic and divide it into sections, project above the room. Openings in the fire walls and nonflammable walls must not constitute more than 25% of their area. They are closed with metal doors or wooden doors made of boards covered with roofing tin, asbestos, or felt impregnated with a nonflammable material.

In addition to the regulations and standards followed for new buildings, fire-prevention measures are taken in already functioning installations:

1. To reduce the probability of ignition and fires from thermal radiation, it is necessary to clean the yards and spaces between buildings, to remove flammable rubbish in advance, and to make it possible for fire trucks to move freely on the grounds of the installation, with ready access to the fire hydrants and water tanks around the buildings.

2. To increase the fire resistance of wooden structures, fire-protective paint and coating are recommended. The paint comes in light colors. Fire-resistant paints, as well as whitewash, are used as protective coatings to reflect radiation. To protect exposed wooden structures the following are used: lime coatings consisting of 62% slaked lime, 32% water, and 6% common salt; a superphosphate coating, consisting of 65% superphosphate and 35% water. A 2-kg coating is required for 1 m^2 of wood surface. The fire-resistant coating is applied in two layers. The general thickness of the protective layer must not be less than 1.0 to 2.5 mm. In the absence of these materials, the wooden parts can be coated with clay.

3. Water tanks are built on the site to extinguish fires caused by thermal radiation. Good approaches must be built to existing water tanks, while platforms and piers should be built on the shores of rivers, lakes, and ponds in order to set up fire pumps. If necessary, the water tanks are partially buried to obtain a sufficient amount of water in winter when ice is at its maximum thickness.

4. If water tanks cannot be installed, deep wells are drilled to obtain water for the industrial needs of the site and to extinguish fires.

Fig. 86. Leaving a damaged shelter.

Fig. 87. Leaving the focal area of destruction.

The order of operations and the standards of conduct for the population in the contaminated region is determined by the civil defense staff, which describes the radiation conditions and advises people what they should do. What people should do depends on the zone of radioactive contamination in which they find themselves.

In the zone of moderate radiation (A), on the boundary of which the radiation dose D_∞ [total dose from time of deposition to infinity] amounts to 40 r, it is advisable to be under cover for several hours, after which one should return home. In the first day it is permissible to leave the house for not longer than 4 hr. Moreover, in dry windy weather it is necessary to use individual means of protection.

In the zone of strong radiation (B), on the boundary of which the radiation dose D_∞ amounts to 400 r, it is necessary to stay under cover for up to three days, after which one may return home. Moreover, one should stay in the house for up to four days. One should leave the house not more than 3 to 4 hr per day. When leaving the house, it is necessary to use individual means of protection, since there is radioactive dust in the air.

In the zone of dangerous contamination (C), on the boundary of which the radiation dose D_∞ amounts to 1200 r, it is necessary to stay under cover longer than three days. After this it will be possible to return home, but not to leave except in utmost necessity and not for more than 4 hr.

These procedures for the population are required when a very high level of radiation is observed. This level drops fairly rapidly: to one-tenth after 7 hr and to one-hundredth after two days. Thus, in the presence of fallout it is necessary to be under cover to reduce the exposure dose. Then, when the radiation level drops, one can go home again. Length of confinement to the shelter depends on the zone in which the people are located and the type of shelter being used.

The degree of radiation attenuation afforded by the shelter is characterized by the shielding coefficient K. Basements of brick buildings and sod-earth covering attenuate radiation 100 times. Thus, in the first period of contamination one must be under such cover. Residential homes have a lower shielding coefficient than do fallout shelters; thus it is practical to be in them [only] after the radiation level drops.

When in contaminated territory, it is necessary to remember that one must never eat food from open containers or drink water from exposed sources since they may be contaminated with radioactive substances. One must eat only protected products, stored in basements, cellars under the floor, refrigerators, cupboards, and in various packages, and also food wrapped in various materials (oilcloth, film, paper). Water for drinking or for preparing food may be taken from water supply lines and from protected wells. Water in open reservoirs covered with a thick layer of ice is also suitable for drinking.

The scintillation method is based on the fact that under the influence of radiation, some substances emit photons of visible light. The light flashes produced (scintillations) can be recorded.

The ionization method is based on the fact that gases in an isolated chamber ionize under the influence of nuclear radiation; electrically neutral atoms (molecules) of the gas split into positive and negative ions. If there are two electrodes in this chamber, to which a constant voltage is applied, then an electrical current flow is produced between the electrodes. A directional stream of the ionized gas particles occurs in the presence of an electrical field, that is, an electrical current called the ionization current flows through the gas. By measuring the ionization current it is possible to determine the radiation intensity.

In modern field dosimeters, the ionization method is the one more widely used to detect and measure radiation. Instruments operating on the principle of the ionization method have basically the same design, including a sensing device (ionization chamber or gas-discharge counter), the electrical circuitry (ionization current amplifier), current indicator (microammeter), and power pack (as a rule, dry-cell batteries).

The ionization chamber [integrating device] is a capacitor, to the plates of which a constant voltage is applied from a battery. The gap between the plates, called the working volume of the chamber, is usually filled with air. In the absence of radioactivity, the air in the chamber is not ionized and no current is conducted. Under the influence of radioactivity, the chamber air is ionized and an ionization current flows through the chamber, creating a voltage drop (Fig. 92) on the resistor connected to the circuit. Since the quantity of the voltage drop is directly proportional to the intensity of the ionization current and, consequently, to the dose rate incident on the chamber, the radiation level can be determined by measuring the voltage drop.

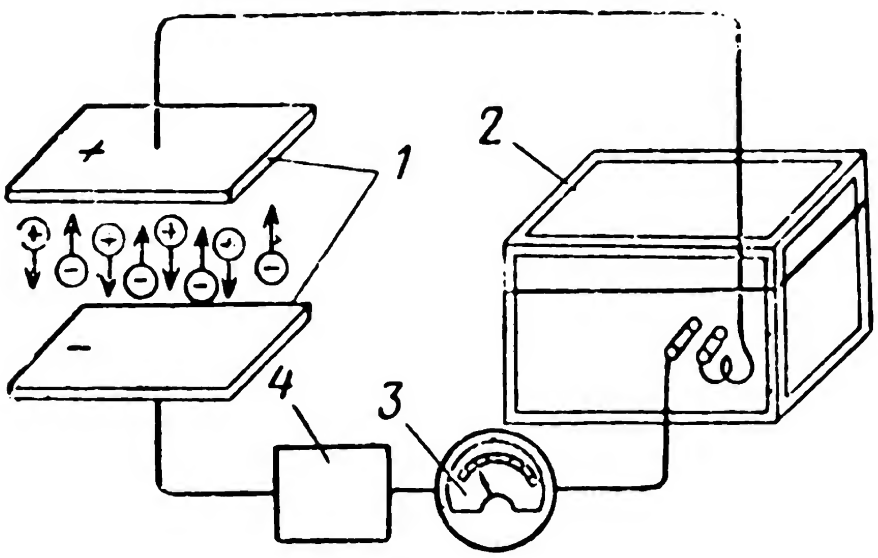


Fig. 92. Schematic diagram of ionization chamber: (1) electrodes; (2) power pack; (3) meter; (4) amplifier.

9.4 Chemical Survey Instruments

Toxic materials in the air, on the terrain, on technical equipment, and on other objects are detected by using chemical surveying instruments and gas detectors or by taking and subsequently analyzing samples in a chemical laboratory. The principle of detecting and identifying toxic materials with chemical survey instruments is based on the color changes toxic material is identified; comparing the color intensity obtained with a color standard makes it possible to judge the approximate concentration of toxic materials in the air or the density of contamination on the object. Chemical surveying instruments are identical in principle. We will examine three models of these instruments: the army chemical surveying instrument (AICS); the chemical surveying instrument (CSI); the semi-automatic chemical surveying instrument (SICS).*

The AICS (Fig. 108) consists of a covered housing containing a hand pump (1), a pump fitting (3), paper adapters with indicator tubes (11), smoke filters (5), protective caps (4), lamp (7), and a heater (8) with 15 cartridges (6). The instrument kit also includes a pin (9), a trowel (10), an instruction book for operating the instrument, and an instruction book for determining the airborne soman-type toxic materials. There is an adjustable shoulder strap (2) for carrying the instrument. The weight of the instrument is about 2.2 kg.

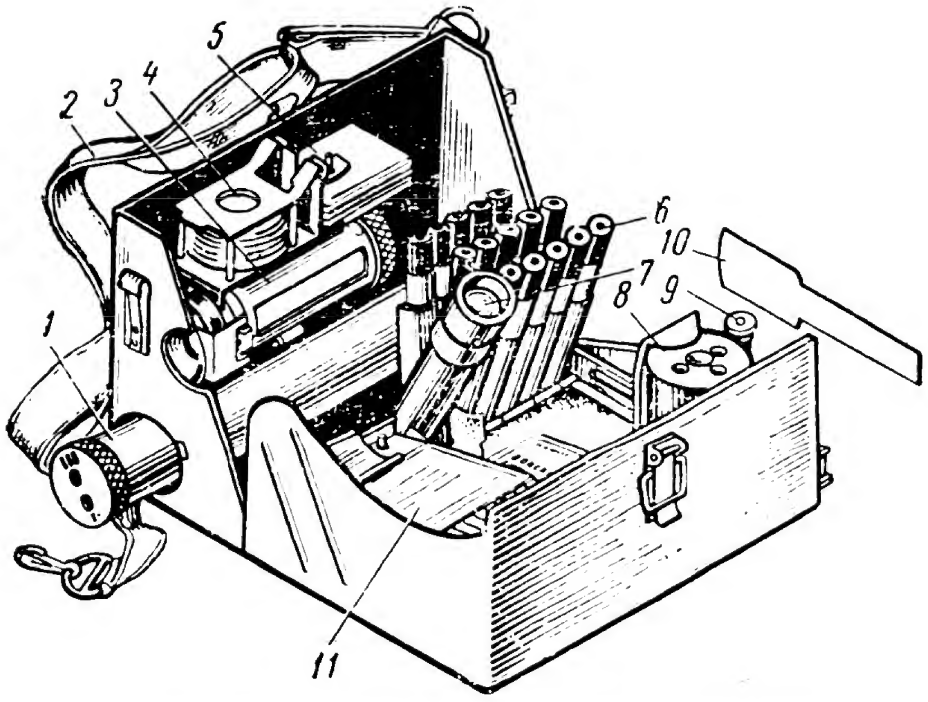


Fig. 108. Army instrument for chemical surveying (AICS).

* Russian designations for these three instruments are: VPKhR, PKhR, and PPKhR, respectively.

The determination of the radiation dose incurred in crossing the fallout track. The radiation dose received while crossing the track of the radioactive cloud is determined approximately by the equation

$$D = \frac{tR_{max}}{4K},$$

where R_{max} is the maximum dose rate encountered along the trip (r/hr), K is the coefficient of attenuation of the dose rate of the vehicle used, and t is the time elapsed in crossing the contaminated area (hr).

The radiation dose incurred during presence in a contaminated area is approximated by the equation

$$D = \frac{tR_{average}}{K}.$$

However, in calculating the allowable duration at work by this equation, there arises an error in connection with the fact that the dose rate does not remain constant. However, the error is conservative in that the allowable duration obtained is on the low side and therefore on the safe side. To determine the allowable elapsed shift time at work accurately it is better to use a radiation slide rule.

The determination of shift time work duration in a contaminated area. The elapsed times allowable in a contaminated area can be determined by (1) a radiation scale or (2) tables of values. The basic data for this determination are:

1. the time of the explosion;
2. the measured radiation level at some elapsed time after the explosion;
3. the time of entry into the "hot" area [affected area] after the explosion;
4. the established allowable dose that may be incurred (received) by personnel.

An example. The nuclear explosion occurred at 0600 hours [o'clock]; the radiation level of 20 r/hr is measured at 0800 hours [o'clock]; the time of entry into the "hot" zone is 0800 hours [o'clock]; the established allowable dose is 40 r. To determine the working time of a shift in contaminated area: According to the radiation scale the working time of a shift is 4 hr. According to Table 40 we find the ratio $D/R = 40/20 = 2$, and the time for entering the focal area is 2 hr. When the convoys cross the boundary, the time of entry is about 2 hr and the ratio $D/R = 2$; according to Table 40, we find the working time is 4 hr.

After determining the working time of a task force and evaluating the circumstances, the CD chief of the facility makes a decision on the basis of which missions can be assigned to the formation commander. The following are indicated:

1. concise information concerning the conditions (the dose rate) and the degree of destruction of buildings and structures;
2. the rescue work site and the order of movement to it;
3. the beginning and duration of task force's working period, measures for protecting personnel, permissible exposure dose, and sequence for checking radioactive exposure;
4. the location of first aid stations and routes for evacuating casualties;
5. the location of the command post and the priority for maintaining communications.

Having set the task, the CD chief of the facility personally leads the subordinate personnel to their own facility and deploys and supervises the rescue work.

In turn, the commander of any formation upon receiving an order formulates the task, evaluates the circumstances, makes a decision, and presents the problem to subordinates. In evaluating the conditions, for example, the detachment commander determines the nature of the damage to the facility, the existence and location of the casualties, the nature and volume of the work to be done, and explores the special features of the terrain on which personnel must operate. In addition, the commander studies the situation and the security of his own, and assigned, formations and the operations of neighboring installations, as well as the effects that weather, the time of day, and the season will have on the work to be done.

When giving assignments to subordinate subunits, the division commander states:

1. the situation at the site;
2. the location and extent of the work;
3. the tasks of subordinate formations and the times for their execution; the permissible exposure dose;

Table 40. Permissible exposure time in an area contaminated by fallout resulting from a nuclear blast

	Time of entry into the contaminated area (from the time of the blast) (hr)												
D/R value*	0.5	1	2	3	4	5	6	7	8	9	10	12	24
	Exposure time (in hours and minutes) for which the determined value *D/R* is obtained for different times of entry into the contaminated area, referred to the blast time.												
0.2	0–15	0–14	0–13	0–12	0–12	0–12	0–12	0–12	0–12	0–12	0–12	0–12	0–12
0.3	0–22	0–22	0–20	0–19	0–19	0–19	0–19	0–18	0–18	0–19	0–18	0–18	0–18
0.4	0–42	0–31	0–27	0–26	0–26	0–25	0–25	0–25	0–25	0–25	0–25	0–24	0–24
0.5	1–02	0–42	0–35	0–34	0–32	0–32	0–32	0–31	0–31	0–31	0–31	0–31	0–30
0.6	1–26	0–54	0–44	0–41	0–39	0–39	0–38	0–38	0–38	0–37	0–37	0–37	0–37
0.7	2–05	1–08	0–52	0–49	0–47	0–46	0–45	0–45	0–44	0–44	0–44	0–44	0–43
0–8	2–56	1–23	1–02	0–57	0–54	0–53	0–52	0–51	0–51	0–51	0–50	0–50	0–49
0.9	4–09	1–42	1–12	1–05	1–02	1–00	0–59	0–58	0–58	0–57	0–57	0–57	0–55
1.0	5–56	2–03	1–23	1–14	1–10	1–08	1–06	1–05	1–05	1–04	1–04	1–03	1–02
2.0	1562–00	11–52	4–06	3–13	2–46	2–35	2–29	2–24	2–20	2–18	2–16	2–13	2–06
2.5		31–00	6–26	4–28	3–48	3–28	3–16	3–08	3–03	2–59	2–55	2–51	2–40
3.0		96–39	9–54	6–09	5–01	4–28	4–10	3–58	3–49	3–43	3–38	3–30	3–14
4.0		3124–00	23–43	11–05	8–12	6–57	6–16	5–50	5–33	5–19	5–10	4–58	4–26
6.0			193–19	35–35	19–48	14–43	12–19	10–55	10–02	9–24	8–57	8–19	7–01
10.0				728–49	124–00	59–18	39–34	30–39	25–42	22–35	21–32	17–52	13–08

* *D/R* equals permissible dose in roentgens divided by the dose rate r/hr at the moment of entry into the contaminated area.

REVIEW: CIVIL DEFENSE TEXT (1986)

Moscow VOYENNYYE ZNANIYA in Russian No 3, 1987 p 41

[Review by N. Korchagina of textbook "Grazhdanskaya Oborona" [Civil Defense] by V.G. Atamanyuk, L.G. Shirshev and N.I. Akimov, edited by D.I. Mikhaylik, Moscow, Vysshaya shkola, 1986, 207 pages]

[Text] This textbook on civil defense for higher technical educational institutions was published late last year. The authors developed this book under a new student training program.

Many of the graduates will become commanders of formations or workers of civil defense services, depending on the specialty obtained. The primary task of the VUZ is to train them in such a manner that they can confidently and competently carry out civil defense measures at those installations where they will later work.

The textbook thoroughly examines questions of the effects of weapons of mass destruction on industrial installations and problems of increasing the stability of operations during wartime. It tells in detail, using specific examples, of the methods for assessing the radiation and chemical situation.

Considerable space is given to protecting the population from weapons of mass destruction and performing rescue and emergency repair work both in the centers of destruction and when mopping up the after-effects of natural disasters, major accidents, and catastrophes.

Materials are set forth well concerning the forms and methods of instructing the population on civil defense, the fundamentals of organizing political educational work, and the moral and psychological training of personnel of formations.

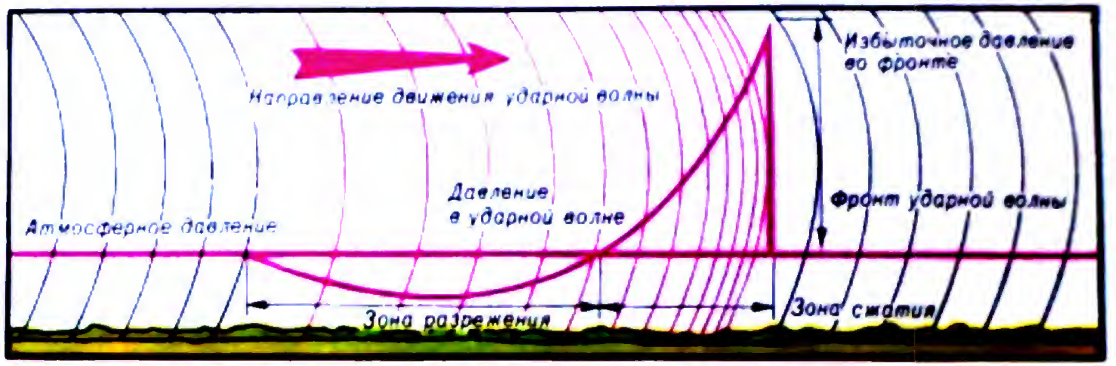
Each of the textbook's sections is illustrated with drawings, figures, diagrams, and graphs.

The training aid has five attachments which cite examples of calculations of parameters of the casualty-producing elements of a nuclear explosion and the loads created by the blast wave, as well as information on the radiation-resistance of materials and components of electronic and electrooptical equipment. In addition, two tables give the technical specifications of modern missiles and strategic bombers of the air forces of the United States, Great Britain, and France, making it possible to present clearly all the basic parameters of these weapons.

УДАРНАЯ ВОЛНА

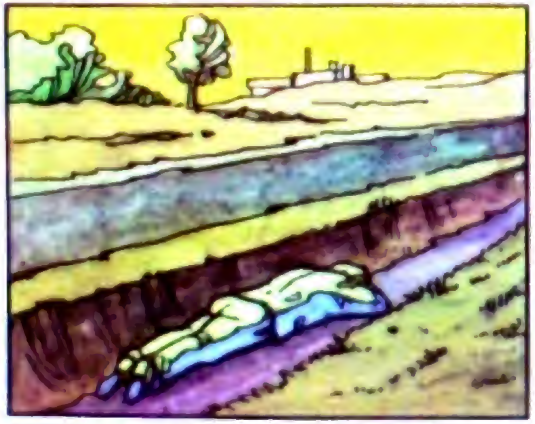
УДАРНАЯ ВОЛНА ЯВЛЯЕТСЯ ОСНОВНЫМ ПОРАЖАЮЩИМ ФАКТОРОМ ЯДЕРНОГО ВЗРЫВА. ОНА ВЫЗЫВАЕТ РАЗЛИЧНЫЕ ПО ХАРАКТЕРУ И ТЯЖЕСТИ ПОРАЖЕНИЯ ЛЮДЕЙ И ЖИВОТНЫХ, РАЗРУШАЕТ ЗДАНИЯ, СООРУЖЕНИЯ. С УДАЛЕНИЕМ ОТ ЦЕНТРА (ЭПИЦЕНТРА) ВЗРЫВА РАЗРУШИТЕЛЬНАЯ СИЛА УДАРНОЙ ВОЛНЫ ОСЛАБЕВАЕТ

СТЕПЕНЬ ПОРАЖЕНИЯ И РАЗРУШЕНИЯ УДАРНОЙ ВОЛНОЙ ЗАВИСИТ ОТ МОЩНОСТИ БОЕПРИПАСА, ВИДА И РАССТОЯНИЯ ОТ ЦЕНТРА (ЭПИЦЕНТРА) ВЗРЫВА, КОНСТРУКЦИИ И РАСПОЛОЖЕНИЯ ЗДАНИЙ И СООРУЖЕНИЙ, ПОЛОЖЕНИЯ ЛЮДЕЙ, ТЕХНИКИ ВО ВРЕМЯ ВОЗДЕЙСТВИЯ УДАРНОЙ ВОЛНЫ, РЕЛЬЕФА МЕСТНОСТИ И ДРУГИХ ФАКТОРОВ



Ударная волна представляет собой область резкого сжатия воздуха, распространяющегося со сверхзвуковой скоростью во все стороны от центра взрыва

Очаг ядерного поражения в зависимости от давления во фронте ударной волны условно делится на зоны разрушений



Убежища защищают от воздействия ударной волны, а укрытия ослабляют ее воздействие

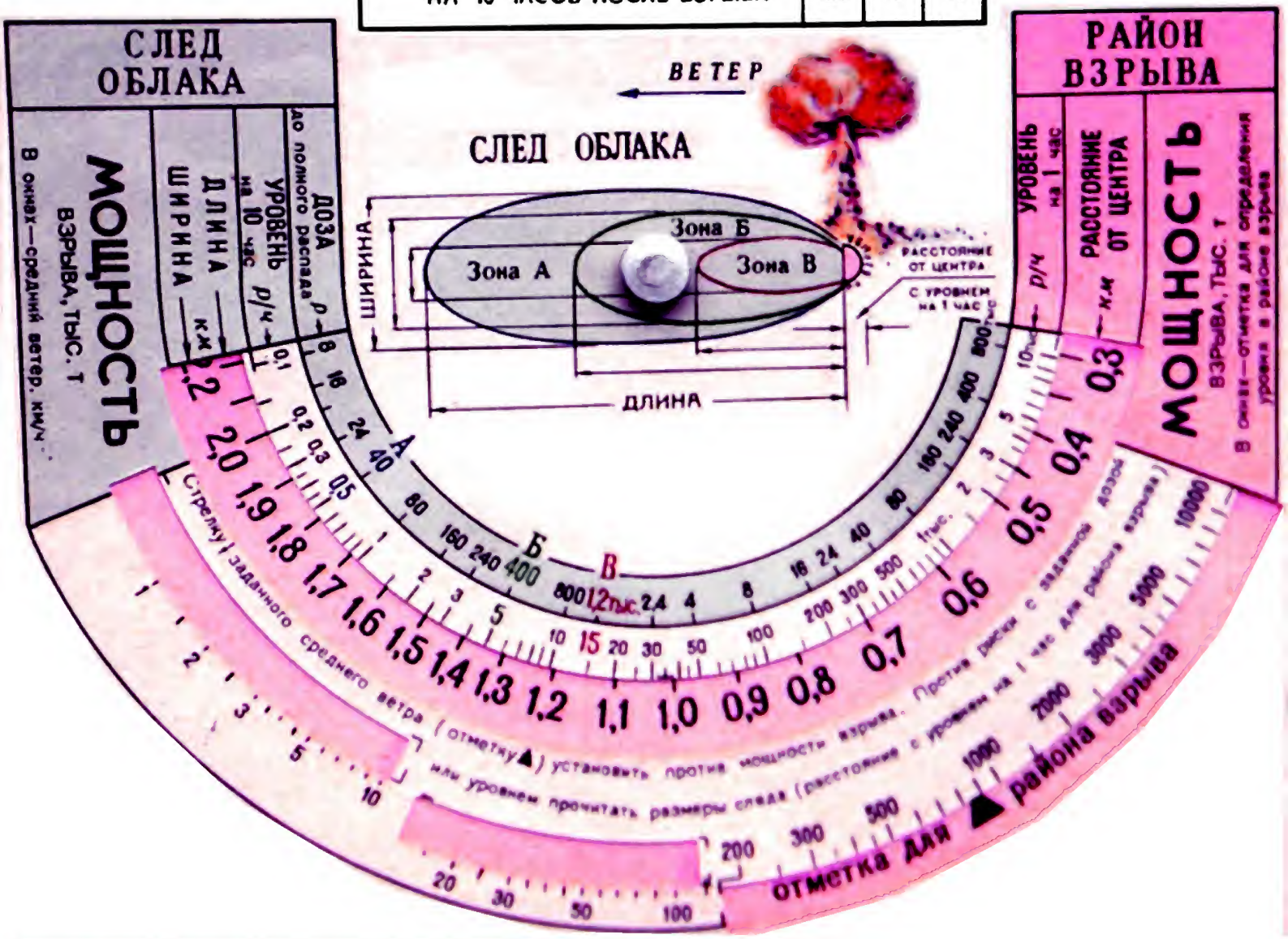
На значительном расстоянии от места взрыва защитой могут служить рельеф местности и местные предметы

ЛИНЕИКА РЛ

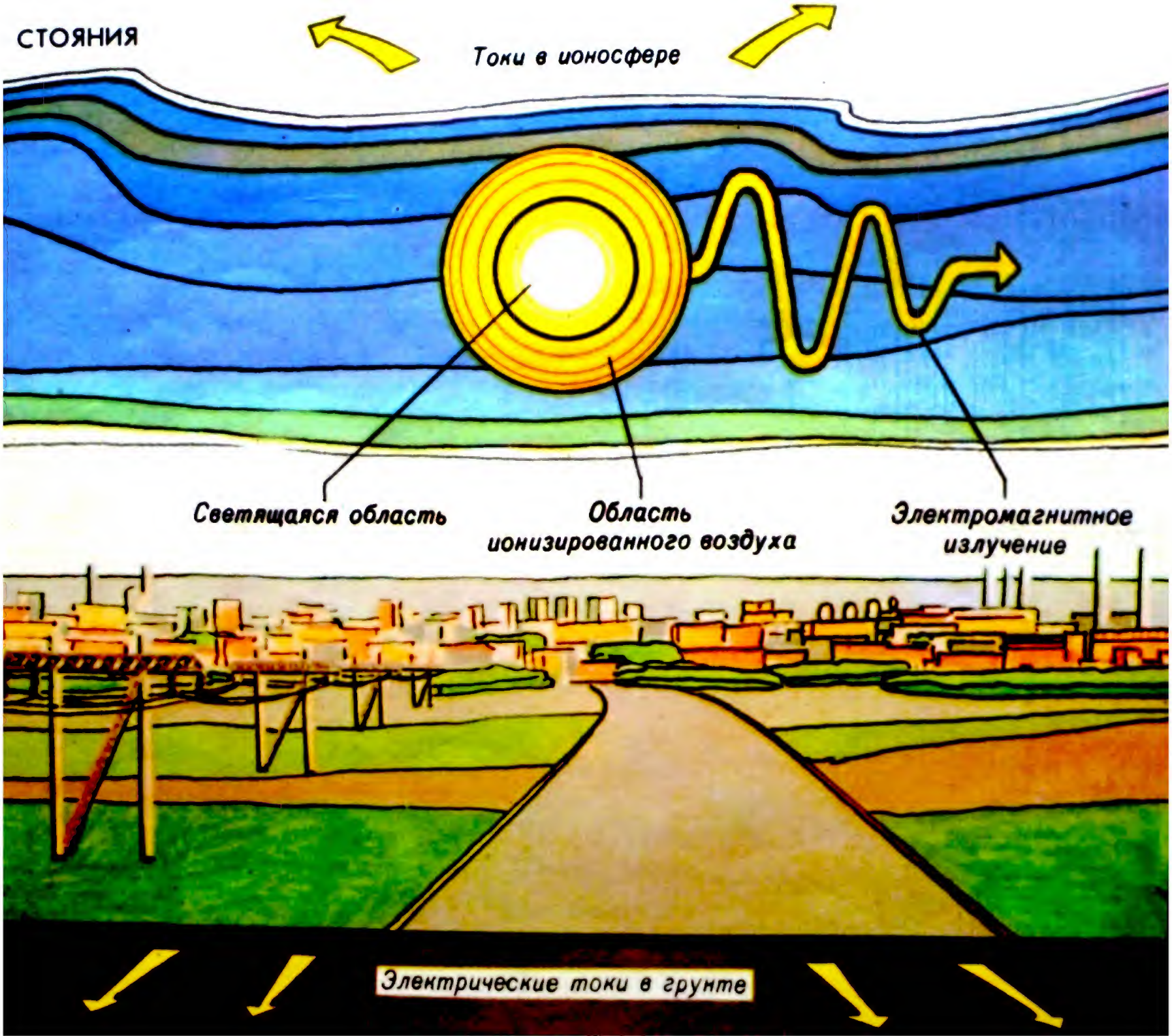
ДЛЯ ОЦЕНКИ РАДИАЦИОННОЙ ОБСТАНОВКИ ПРИ НАЗЕМНЫХ ВЗРЫВАХ

ТАБЛ I ХАРАКТЕРИСТИКИ ЗОН ЗАРАЖЕНИЯ ПО СЛЕДУ ОБЛАКА (НА ВНЕШНИХ ГРАНИЦАХ)

ПОКАЗАТЕЛИ	ЗОНЫ		
	А	Б	В
ДОЗЫ ДО ПОЛНОГО РАСПАДА, р	40	400	1200
СРЕДНИЕ УРОВНИ РАДИАЦИИ, р/ч НА 10 ЧАСОВ ПОСЛЕ ВЗРЫВА	0,5	5	15



СТОЯНИЯ

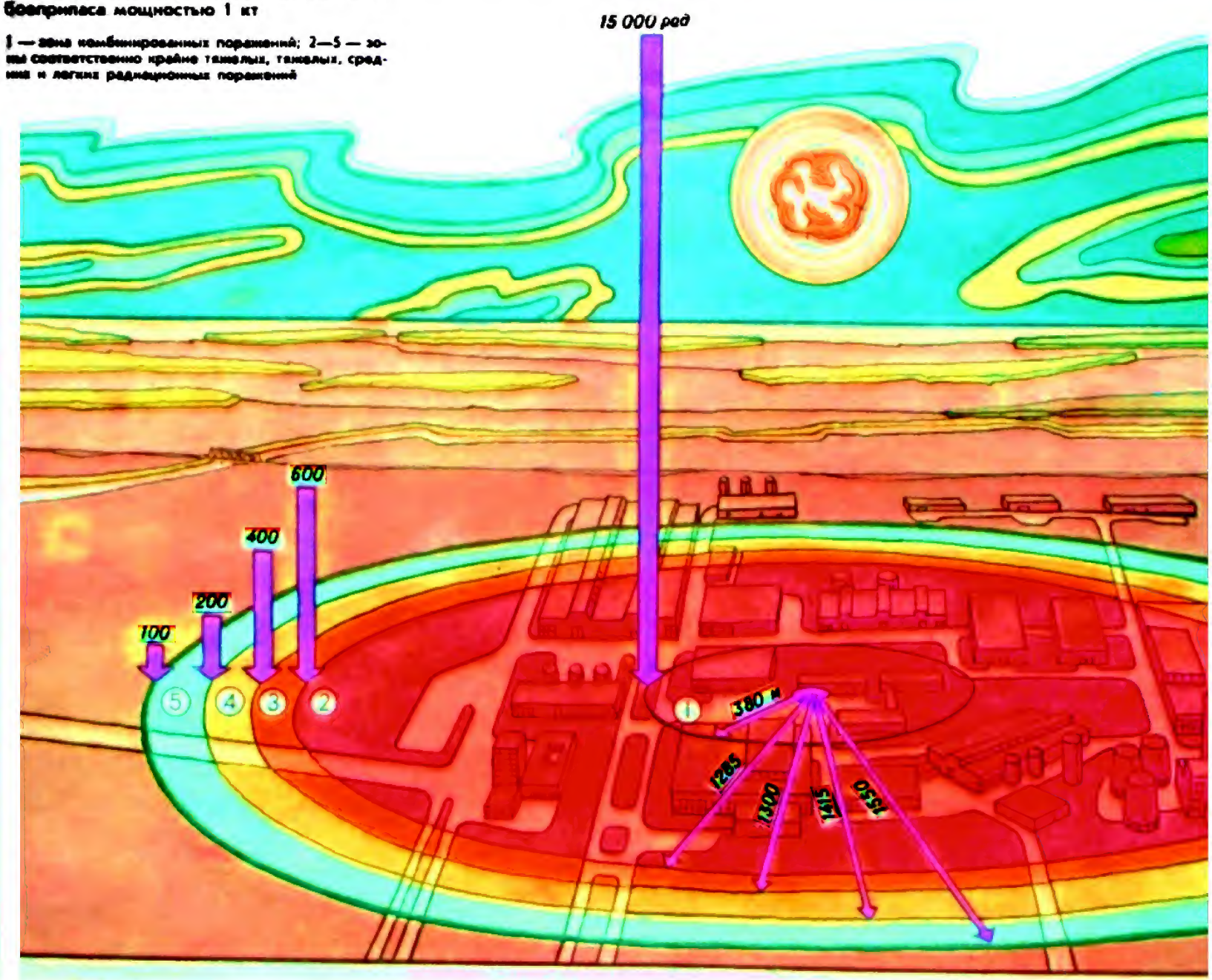

Токи в ионосфере
Светящаяся область
Область ионизированного воздуха
Электромагнитное излучение
Электрические токи в грунте

НЕЙТРОННОЕ ОРУЖИЕ И ОСОБЕННОСТИ ЗАЩИТЫ ОТ НЕГО

НЕЙТРОННОЕ ОРУЖИЕ — ЭТО НЕЙТРОННЫЕ БОЕПРИПАСЫ И СРЕДСТВА ДОСТАВКИ ИХ К ЦЕЛИ. **НЕЙТРОННЫЙ БОЕПРИПАС** — ТЕРМОЯДЕРНЫЙ ЗАРЯД СВЕРХМАЛОЙ МОЩНОСТИ (0,5—2,0 кт), ДЕЙСТВИЕ ЕГО ОСНОВАНО НА РЕАКЦИИ СИНТЕЗА НУКЛИДОВ ВОДОРОДА — ДЕЙТЕРИЯ И ТРИТИЯ

Очаг поражения при взрыве нейтронного боеприпаса мощностью 1 кт

1 — зона комбинированных поражений; 2—5 — зоны соответственно крайне тяжелых, тяжелых, средних и легких радиационных поражений



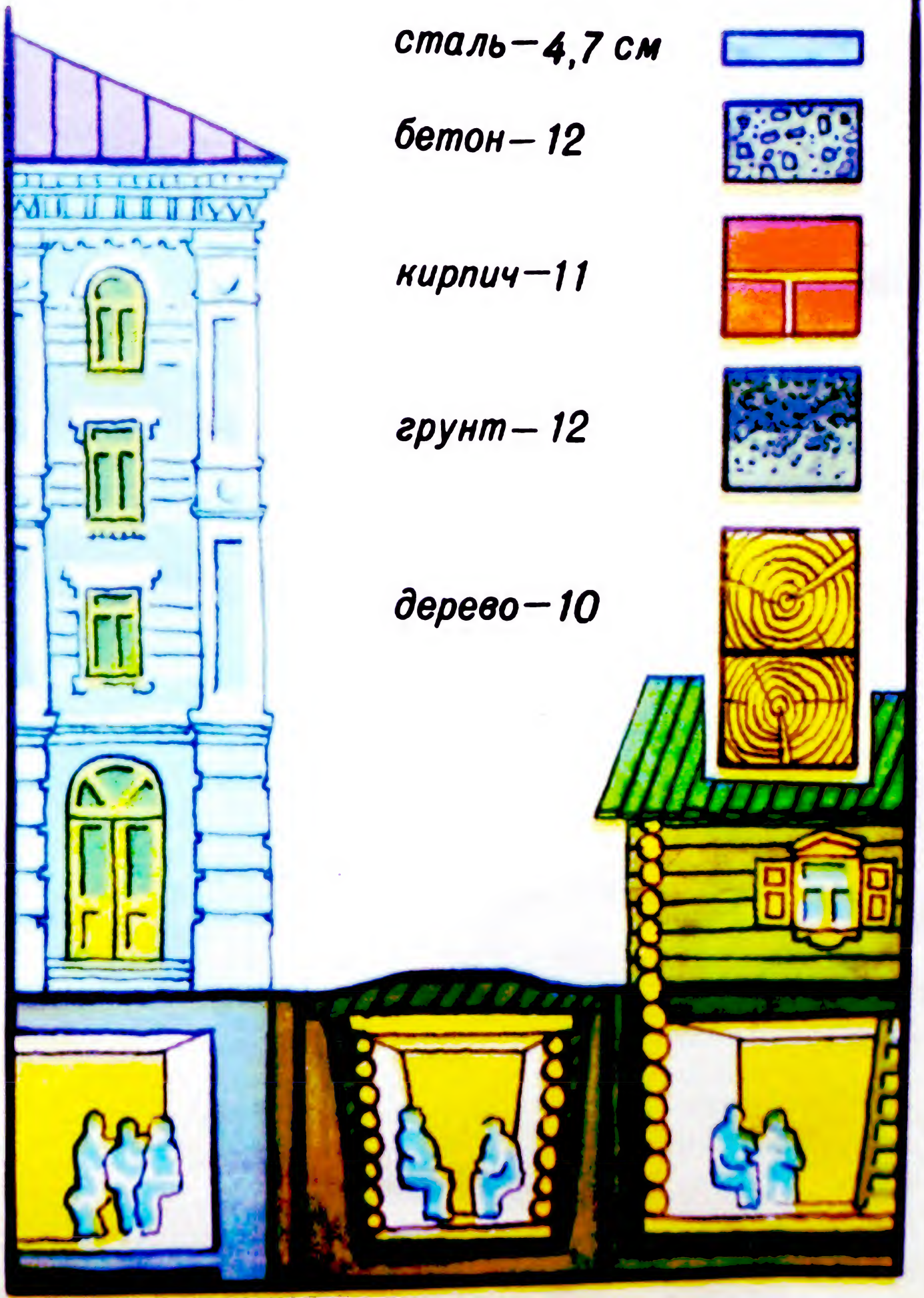
РАСПРЕДЕЛЕНИЕ ЭНЕРГИИ ВЗРЫВА НЕЙТРОННОГО И ЯДЕРНОГО БОЕПРИПАСА

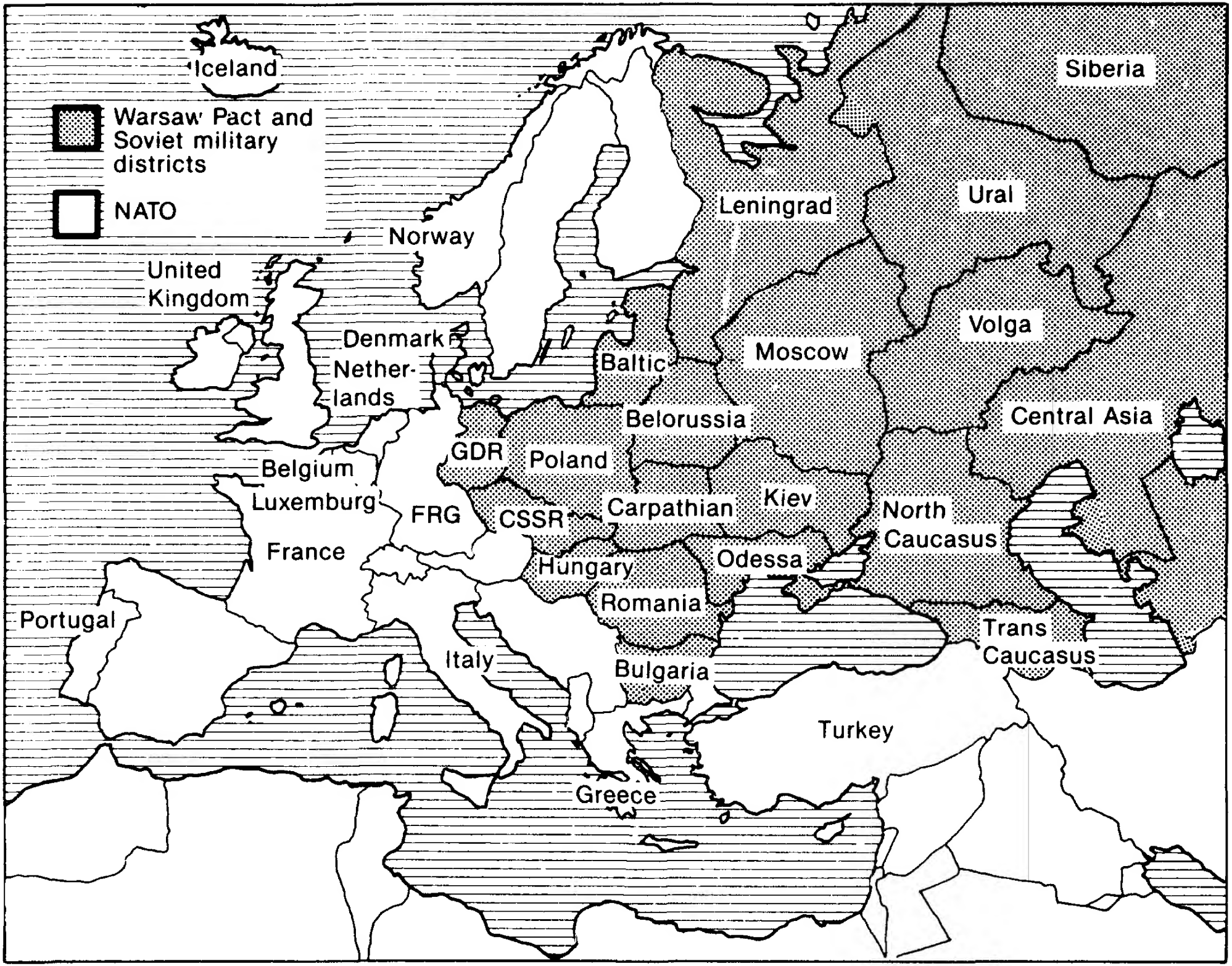
Поражающий фактор	Энергия боеприпаса, %: нейтронного	ядерного
Ударная волна	40	50
Световое излучение	30	35
Проникающая радиация	25	5
Радиоактивное заражение	5	10

ЗАЩИТНЫЕ СВОЙСТВА МАТЕРИАЛОВ

Экспозиционную дозу радиации ослабляют вдвое материалы толщиной

Экспозиционную дозу радиации ослабляют вдвое материалы толщиной




Warsaw Pact and Soviet military districts
NATO
Iceland
Norway
United Kingdom
Denmark
Nether-lands
Belgium
Luxemburg
France
FRG
GDR
Poland
CSSR
Hungary
Romania
Bulgaria
Italy
Portugal
Greece
Turkey
Baltic
Belorussia
Moscow
Leningrad
Carpathian
Kiev
Odessa
North Caucasus
Trans Caucasus
Ural
Volga
Central Asia
Siberia

Gorbachev's Economic Program: Problems Emerge

DDB-1900-187-88
June 1988

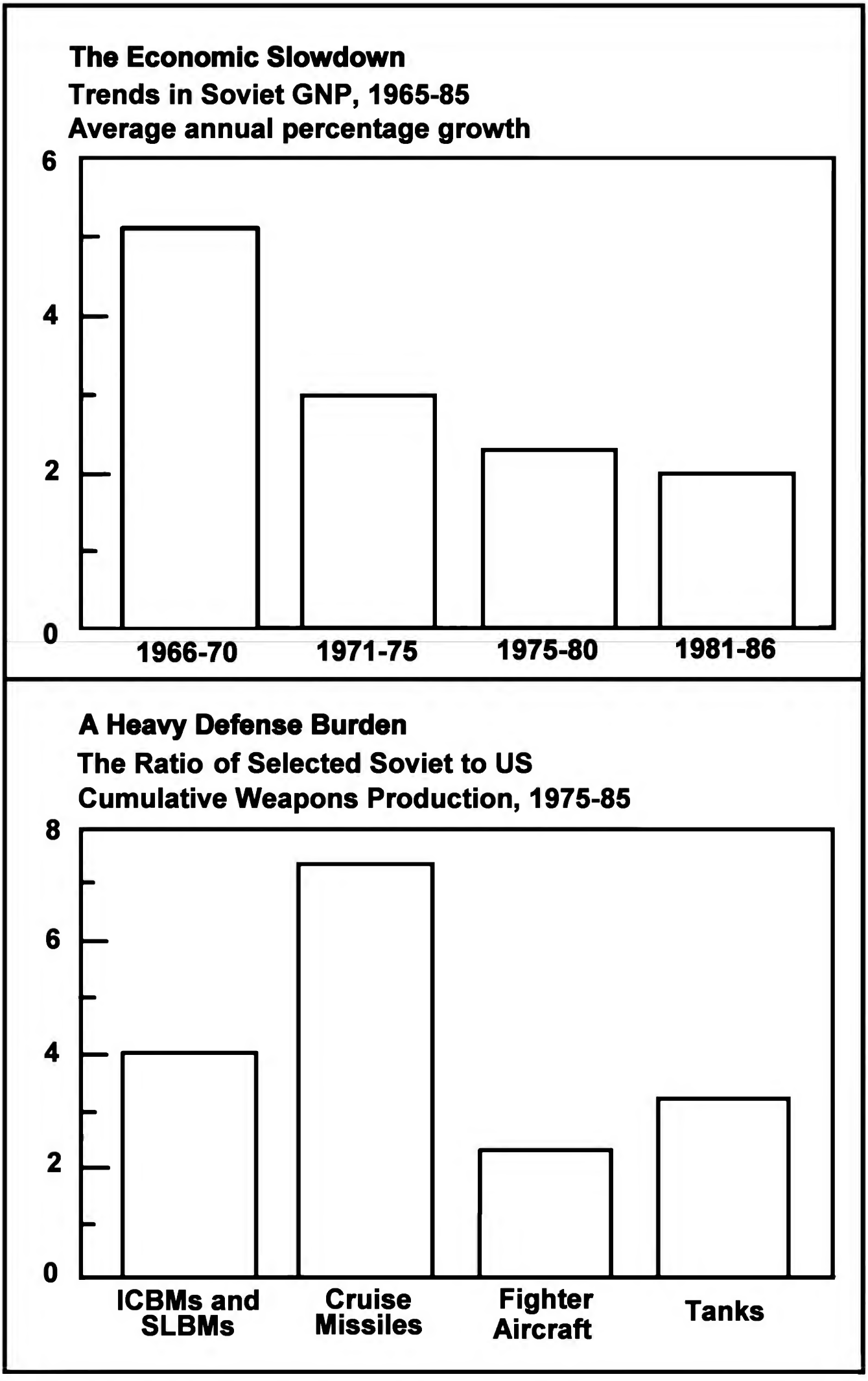
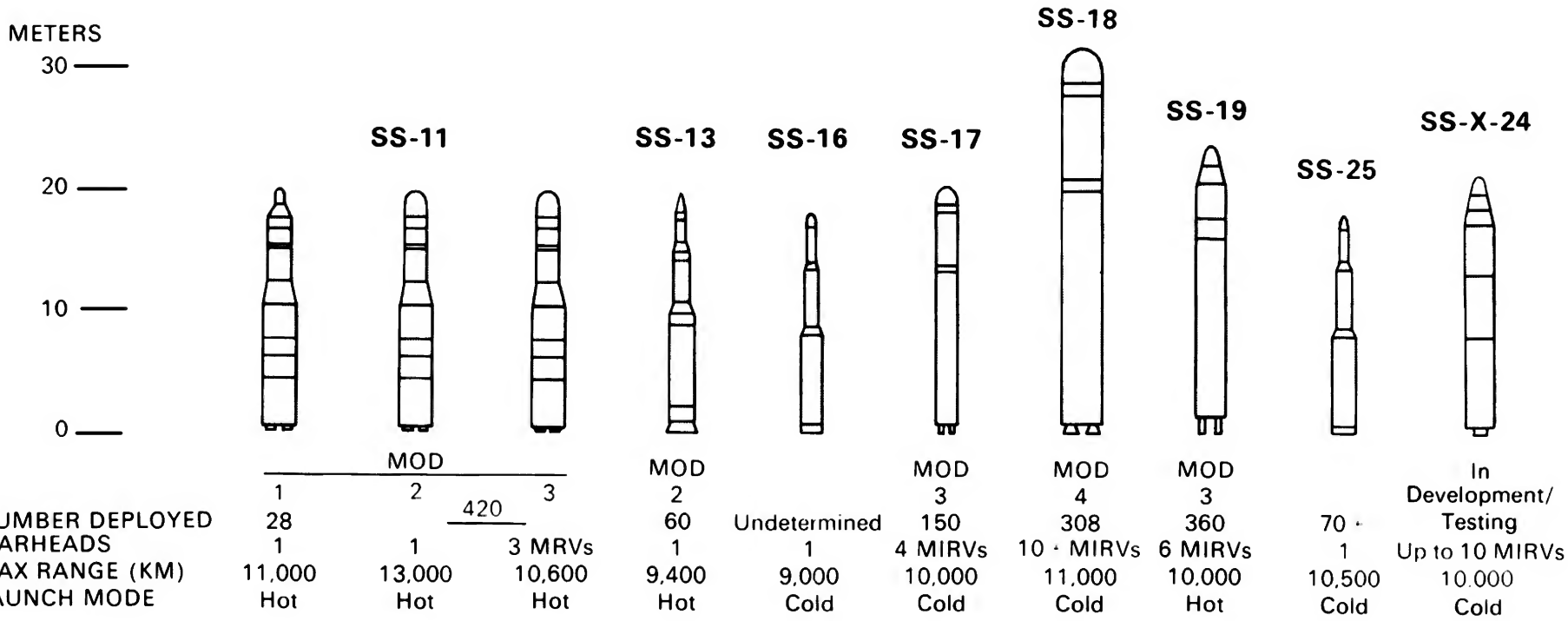


Figure 1. Gorbachev's Domestic Imperative

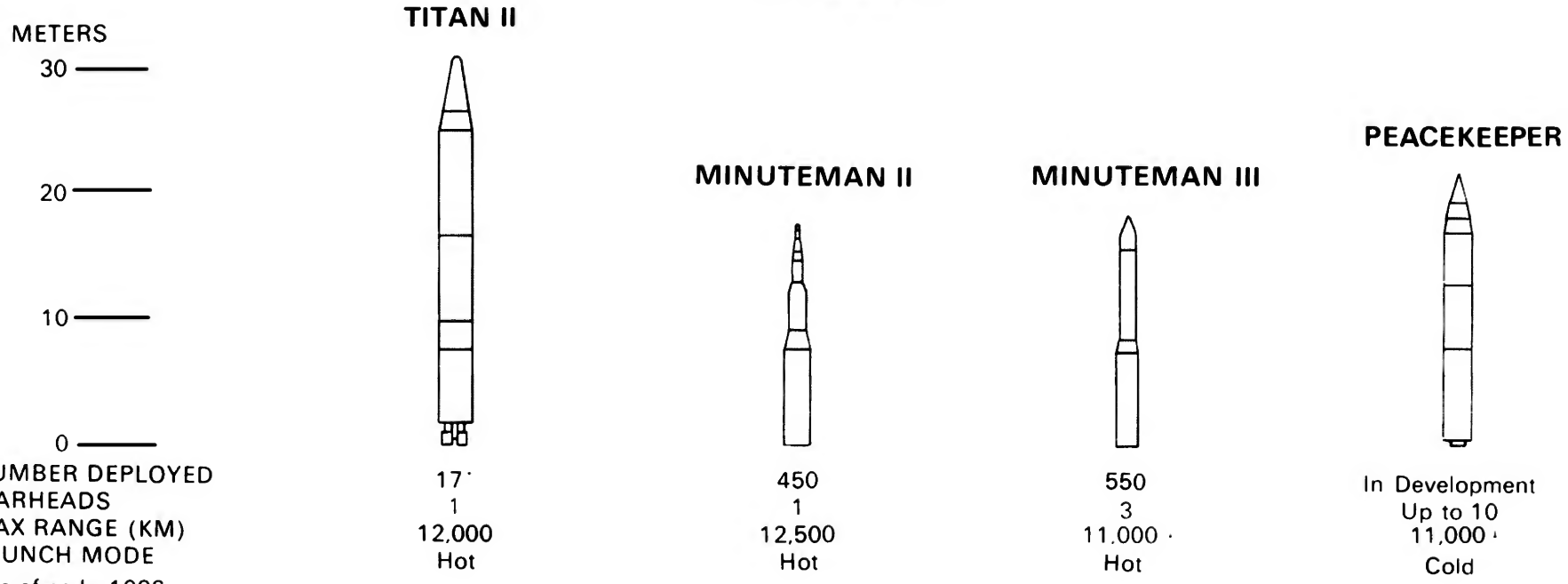
SOVIET MILITARY POWER

1986

USSR ICBMs



US ICBMs



· As of early 1986

CIVIL PREPAREDNESS AND LIMITED NUCLEAR WAR

HEARINGS

BEFORE THE

JOINT COMMITTEE ON DEFENSE PRODUCTION CONGRESS OF THE UNITED STATES

NINETY-FOURTH CONGRESS

SECOND SESSION

APRIL 28, 1976

Printed for the use of the
Joint Committee on Defense Production

U.S. GOVERNMENT PRINTING OFFICE

74-307 WASHINGTON : 1976

HEARING ON CIVIL PREPAREDNESS AND LIMITED NUCLEAR WAR

WEDNESDAY APRIL 28, 1976

U.S. SENATE AND
U.S. HOUSE OF REPRESENTATIVES,
JOINT COMMITTEE ON DEFENSE PRODUCTION,
Washington, D.C.

The committee met at 10:05 a.m. in room 5302, Dirksen Senate Office Building, Hon. William Proxmire, vice chairman of the subcommittee, presiding.

Present: Senators William Proxmire and John Sparkman.

Senator PROXMIRE. The committee will come to order.

Today's hearing inaugurates a review by the Joint Committee on our Nation's civil preparedness. It is the first such congressional review in over two decades.

By civil preparedness, we mean those mainly civilian measures by which we seek to protect the lives and property of our citizens.

This is the first function of any government. A government which cannot meet this fundamental test of defending its people and the national treasure is not likely to survive for very long.

In subsequent hearings, the committee will examine the adequacy of Federal, State, and local preparedness programs, including plans for fallout shelters, strategic evacuation, preparedness exercises and drills, civil defense stockpiles, and continuity of government. Likewise, the Joint Committee will inquire into the organization of the Government for preparedness. It will also review the Nation's industrial and economic preparedness in terms of the defense industrial base.

This is an especially timely undertaking. Over the past 2 years the United States has been moving from a declared nuclear policy of mutual assured destruction to one of flexible response, or limited nuclear war.

In the minds of some eminent strategists, this implies a lowering of the nuclear weapons threshold, a quickening of the trigger finger on the missile launch console, and an increased probability of uncontrolled nuclear conflict.

But to other equally qualified experts, this shift in strategic doctrine, this shift to larger numbers of more flexible, or more versatile and accurate weapons and control systems does not undermine deterrence of nuclear war; instead, it enhances deterrence.

Well, it can't be both ways and whenever you have such a complete divergence in expert opinion, it is time for a careful review of the facts.

These hearings are also timely in that there are increasing rumors of a civil defense gap, with the Soviet Union well in the lead.

In this year's annual report, Defense Secretary Rumsfeld stated that, and I quote:

> An asymmetry has developed over the years that bears directly on our strategic relationship with the Soviets and on the credibility of our deterrent posture. For a number of years, the Soviets have devoted considerable resources to their civil defense effort which emphasizes the extensive evacuation of urban populations prior to the outbreak of hostilities, the construction of shelters in outlying areas, and compulsory training in civil defense for well over half the Soviet population. The importance the Soviets attach to this program at present is indicated not only by the resources they have been willing to incur in its support, but also by the appointment of a deputy minister of defense to head this effort.

Now, the term "asymmetry" used by the Secretary sounds to a nonexpert like me like a four-bit word for "gap." We have heard a great deal over the years about gaps that never materialized or proved unimportant. Yet we have spent a lot of money to eliminate the nonexistent or the insignificant. It is for this reason that the committee last week published the declassified text of the 1957 Gaither Report which invented the first missile gap.

STATEMENT OF HON. PAUL NITZE, FORMER SECRETARY OF THE NAVY, DEPUTY SECRETARY OF DEFENSE, AND MEMBER OF THE SALT DELEGATION

Mr. NITZE. Mr. Chairman, my interest in the questions which this committee is discussing began in 1944 when I was asked to be a director of the U.S. Strategic Bombing Survey. The required qualification of the directors was that they have no prior knowledge of military strategy or of air power, and could thus be presumed to be unbiased in appraising the effects of the immense U.S. strategic air effort in World War II. I spent the next 2 years in Europe and then in the Pacific in intensive work, in association with what I believe to have been the best talent available to this country, to try to understand something about both subjects. In the Pacific portion of the survey, as Vice Chairman, I was in effective command of the operation, including the detailed study of the effects of the weapons used at Hiroshima and Nagasaki.

Since that time much has changed. Weapons have increased in yield and missiles now have an intercontinental range. But these changes are hardly as revolutionary as the changes brought about by the role of effective air power in World War II and of the introduction of nuclear weapons in its closing phase. After all, the largest number of our nuclear reentry vehicles today are Poseidon warheads, each of which has an equivalent megatonnage less than twice that of the weapons used at Hiroshima and Nagasaki.

At Hiroshima and Nagasaki there was no air-raid warning and very few people availed themselves of the crude civil defense facilities which were available. Most of those that did, even at ground zero, in other words, directly under the explosion, which was at the optimum height of burst, survived. The trains were operating through Hiroshima 2 days after the explosion.

Let me paraphrase from an interchange I had in 1960 with Colonel Lincoln, head of the faculty at West Point, on this subject:

The Russians are careful students of Clausewitz. I do not believe they would ever ignore either the danger that a war once started might escalate to the full violence which the pure theory of war might indicate; on the other hand, they would never forget that war is a tool of policy and that every effort must be made to avoid letting it so escalate.[1]

[1] In this connection the following quotation from *Communist of the Armed Forces* in November 1975 is pertinent: "The premise of Marxism-Leninism on war as a continuation of policy by military means remains true in an atmosphere of fundamental changes in military matters. The attempt of certain bourgeois ideologists to prove that nuclear missile weapons leave war outside the framework of policy and that nuclear war moves beyond the control of policy, ceases to be an instrument of policy and does not constitute its continuation is theoretically incorrect and politically reactionary."

On the other hand, I can well imagine that they might consider a controlled nuclear conflict in which significant military targets, but not urban-industrial targets, are the initial objects of attack, if they thought war unavoidable.

In conclusion, I would like to comment on this committee's print containing the Gaither Report of 1957.

I have now read that report for the first time in nearly 20 years. I am impressed—especially in light of the information then available to the Gaither committee—by the care and comprehensiveness of that committee's examination of the problems assigned to it for study. I note in contrast the cavalier imprecision reflected in the foreword prepared by this committee's staff.

It is not true that the Gaither Report ignored arms control, nor is it true that the report spoke of U.S. strategic inferiority as then a fact. To the contrary, the Gaither Report described the United States as then "capable of making a decisive attack on the U.S.S.R." In view of SAC's vulnerability "to a surprise attack in a period of lessened world tension," the Gaither Report also noted the U.S.S.R.'s capability to make "a very destructive attack on this country."

The report then observed, "As soon as SAC acquires an effective 'alert' status, the United States will be able to carry out a decisive attack even if surprised," and it anticipated that juncture "as the best time to negotiate from strength, since the U.S. military position vis-a-vis Russia might never be so strong again."

In attempting to disparage the Gaither committee's analysis, the staff foreword cites a subsequent estimate "* * * that at the time of the Gaither Report the Soviet Union probably had fewer than a dozen operational ICBMs." In fact, at the time of the Gaither Report—only a few weeks after the sputnik launching—the Soviet Union obviously had no operational ICBMs. The Gaither Report made no assumption to the contrary. Indeed, it postulated 1959 as the probable year the Soviet Union would first have operational ICBMs; in fact, they first became operational in 1960. What was crucial at the time was not only the question of how many ICBMs would be operational when, but even more importantly the question of the speed with which the U.S. Air Force could achieve adequate early warning facilities and an appropriate alert posture.

The Gaither Report focused attention on those questions.

Summary Statement by the Honorable Paul H. Nitze

Mr. Chairman: My interest in the questions which this Committee is discussing began in 1944 when I was asked to be a director of the U.S. Strategic Bombing Survey. The required qualification of the directors was that they have no prior knowledge of military strategy or of air power, and could thus be presumed to be unbiased in appraising the effects of the immense U.S. strategic air effort in World War II. I spent the next two years in Europe and then in the Pacific in intensive work, in association with what I believe to have been the best talent available to this country, to try to understand something about both subjects. In the Pacific portion of the Survey, as Vice Chairman I was in effective command of the operation, including the detailed study of the effects of the weapons used at Hiroshima and Nagasaki.

Since that time much has changed. Weapons have increased in yield and missiles now have an intercontinental range. But these changes are hardly as revolutionary as the changes brought about by the role of effective air power in World War II and of the introduction of nuclear weapons in its closing phase. After all, the largest number of our nuclear reentry vehicles today are Poseidon warheads, each of which has an equivalent megatonnage less than twice that of the weapons used at Hiroshima and Nagasaki.

At Hiroshima and Nagasaki there was no air-raid warning and very few people availed themselves of the crude civil defense facilities which were available. Most of those that did, even at ground zero, in other words, directly under the explosion, which was at the optimum height of burst, survived. The trains were operating through Hiroshima two days after the explosion.

Let me paraphrase from an interchange I had in 1960 with Colonel Lincoln, head of the faculty at West Point, on this subject:

The Russians are careful students of Clausewitz. I do not believe they would ever ignore either the danger that a war once started might escalate to the full violence which the pure theory of war might indicate; on the other hand, they would never forget that war is a tool of policy and that every effort must be made to avoid letting it so escalate.

I believe they will always pay close attention to the interrelationship of the offense and the defense and not ignore either side of the equation. I cannot believe they would so ignore the military core of war as to consider the type of controlled nuclear conflict discussed in some of the papers circulated by the Committee's staff where military targets are avoided and industrial targets are hit. On the other hand, I can well imagine that they might consider a controlled nuclear conflict in which significant military targets, but not urban-industrial targets, are the initial objects of attack, if they thought war unavoidable.

In conclusion, I would like to comment on this Committee's print containing the Gaither Report of 1957.

I have now read that Report for the first time in nearly twenty years. I am impressed—especially in light of the information then available to the Gaither Committee—by the care and comprehensiveness of that Committee's examination of the problems assigned to it for study. I note in contrast the cavalier imprecision reflected in the foreword prepared by this Committee's staff.

It is not true that the Gaither Report ignored arms control, nor is it true that the report spoke of U.S. strategic inferiority as then a fact. To the contrary, the Gaither Report described the U.S. as then "capable of making a decisive attack on the USSR." In view of SAC's vulnerability "to a surprise attack in a period of lessened world tension," the Gaither Report also noted the USSR's capability to make "a very destructive attack on this country." The Report then observed, "As soon as SAC acquires an effective 'alert' status, the United States will be able to carry out a decisive attack even if surprised," and it anticipated that juncture as "the best time to negotiate from strength, since the U.S. military position vis-a-vis Russia might never be so strong again."

In attempting to disparage the Gaither Committee's analysis, the staff foreword cites a subsequent estimate "* * * that at the time of the Gaither Report the Soviet Union probably had fewer than a dozen operational ICBMs." In fact, at the time of the Gaither Report—only a few weeks after the Sputnik launching—the Soviet Union obviously had no operational ICBMs. The Gaither Report

made no assumption to the contrary. Indeed, it postulated 1959 as the probable year the Soviet Union would first have operational ICBMs; in fact, they first became operational in 1960. What was crucial at the time was not only the question of how many ICBMs would be operational when, but even more importantly the question of the speed with which the Air Force could achieve adequate early warning facilities and an appropriate alert posture.

The Gaither Report focused attention on those questions. Thereby the Report became a factor in stimulating an enormous effort on the part of the U.S. to move ahead with pertinent strategic programs. In those years the rate of expenditure on strategic programs was, allowing for inflation, about two and a half times the present rate. For all the great expense, the program was a bargain when considered against the calamitous potential consequences of permitting the strategic relationship to become unstable to the detriment of U.S. security and with increased risk to the maintenance of peace.

The Report placed first priority on the military measures necessary to maintain strategic stability and high quality deterrence. It placed a lower priority on those measures necessary to ensure survivability of the population in event deterrence were to fail. The two classes of measures are, however, interrelated.

STATEMENT OF HERMAN KAHN, DIRECTOR, HUDSON INSTITUTE

Senator PROXMIRE. Mr. Kahn.

Mr. KAHN. It is customary to start one's testimony with a statement of qualifications. Let me instead start with a disqualification.

I haven't really been spending very much time in the military field since 1965, but I started to go back last year, and I am now in the middle of reacquainting myself with the issues.

I might say though that comparing today's discussion to the sixties, there has been very little substantial improvement. In fact there have been some retrogressions. This both disturbs and surprises me.

Let me start by agreeing with Paul on two issues. The chairman just stated we can't have both increased and decreased deterrence. I believe that there are many measures which can go in both directions.

There are many measures which increase deterrence in one scenario or context, and decrease deterrence in another scenario or context. In particular, if one focuses on this abstract war, what Paul referred to as a pure military war, or a surprise attack out of the blue directed against civilians, then it is terribly easy to do many things which will decrease that deterrence.

But since I tend to feel we have, relatively speaking, too much deterrence of this situation I do not object to decreasing the deterrence of surprise attack out of the blue in favor of increasing deterrence in other situations. In fact there has been much too much attention to this simple situation. I know back in 1960, a number of polls were taken by Tom Schelling, by Weapon Systems Evaluation Group (WSEG) and others. In these polls analysts were asked "If a war occurred, what scenario do you think would have preceded the war?"

Almost universally, they agreed there would have been a very tense situation, say bombs bursting in Europe, and then either an attack by the Soviets because they got into serious trouble, an accidental war, or an attack by the U.S. All the analysts agreed that a surprise attack out of the blue, directed at cities, was far and away the least probable way that a war was likely to start.

And yet they all also agreed that 90 percent of their personal studies and effort went to that case and the other 10 percent or so went into a study of a surprise attack out of the blue which hit military bases. In other words, the analysts agreed, that even though they were able

to choose their own subjects of study, they were spending almost all of their time on scenarios which, in their judgment, were not probable or important. They simply were the easiest things to study and talk about.

[Additional remarks:]
Many analysts are still doing this, but do not seem to know that this emphasis distorts the realistic priorities.

Now, when we looked at civil defense in 1960—or today—it was really almost impossible to protect the population against a surprise attack directed against them. We found that it was also impossible to protect an economic base for massive war production against a surprise attack directed against the economic base.

Therefore, we did not ask ourselves, as a high priority, what does civil defense do for these objectives in these scenarios.

However we did not stop there. We went on to ask ourselves if there were any other roles for civil defense.

It seemed to us that there were a large number of roles. All of them tended to be second or third priority but still terribly important. When people said, "But that doesn't do any good in the first priority situation," we answered, "We don't care."

The first, perhaps the most important role, is to protect people when they are not targets. I am prepared to believe that doing this decreases deterrence, but I am willing to do it anyway.

I know when I examine the problem of attacking the Soviet Union that I want to preserve Moscow and Leningrad, my two biggest assets, and anything they do to make Moscow and Leningrad safe from becoming bonus targets improves my ability to plan war against the Soviets. Moscow and Leningrad are important to the Soviets and they are probably willing to do that. Deterrence is not the sole objective of policy.

In a book called *On Thermonuclear War* which I published in 1960, we mentioned what we called the Doomsday Machine was the highest possible deterrent, yet nobody wanted it. I might also mention that I made clear, in that book, that we didn't think there was any missile gap. In fact, just to go back over a little history of that, most people's recollection of the debate of that period tends to be wrong.

It is not true that the Democrats raised the issue of a missile gap against the Republican administration. That was a Republican statement. The Republicans predicted the Russians would have 300 missiles by 1960. But at the same time, the Republican administration said this wouldn't make any difference, because we had 2,000 bombers and they were more important than 300 missiles.

The great contribution of the Gaither Report, as Paul just said, was to make clear that if the Soviets had 300 missiles and we did not have any kind of warning system, then we might not have 2,000 bombers, because they could be destroyed by a surprise attack while still on the ground.

I also made clear, that while the Soviets probably would not have 300 operational missiles in 1960, if they did have them, we would be in trouble—that is, despite the predictions by the Republican administration we did not think they had such a force—but we were not sure.

What does one do when the other side may be able to do something in the near future and if one waits until he is certain before reacting, it is too late, while if one reacts early it may turn out to have been unnecessary?

Let me also make a remark about a release I saw from this committee which listed a series of predicted gaps which did not occur. In at least half the cases, people were rather clear that the gap might not occur, but they were not sure.

[Additional remarks:]
But they felt they had to worry about it ahead of time and even make some preparations because they could not afford to wait until all the facts were in.

Let me ask a question: What do you do if the other side exhibits a weapon system and has the production capability? You are not quite sure what he is going to do. Do you wait until he does it or do you worry about it?

In general this is a very complicated issue. In some cases, we almost have to make preparations ahead of time, even though they may be wasted. In other cases, we should wait until we are more sure; in still other cases, one just hopes for luck. But one should not, in my judgment, downgrade responsible officials who get concerned under such circumstances.

I might also draw attention to some studies done by Albert Wohlstetter. It is pointed out in these studies that in most cases, we have underestimated rather than overestimated U.S.S.R. future capability. I will ask that this report be sent to the committee.

If you look at the record, there has been more a problem of underestimation than overestimation. This is true in terms of the number of missiles the Soviets have had over time and in terms of Soviet capability on all kinds of other issues. We tend to remember the discussion when some hysterical people overstate the problem; then it turns out to be wrong. I would argue this is not at all the characteristic problem.

Let me turn to the major point I wanted to make today. I would argue that the scenario I worry about as the most probable scenario, is also the scenario which is least discussed. This is the case where there is opportunity for significant or even all-out mobilization before major thermonuclear attacks against the cities occur.

There are two recent and useful historical examples which illustrate this concept, the Korean War and World War II.

In June 1950, Congress was debating whether the budget should be $15, $16 or $17 billion. The previous year it had been $13 billion. A number of distinguished witnesses testified that $18 billion would strain the economy, but $16 billion was all right. North Korea marched on South Korea, and within 1 year, Congress authorized $60 billion, an increase by a factor of 4.

This was totally unexpected and totally changed the strategic problem. One should note that it would not have been possible to fit into even an $18 billion budget hardly any of the weapons systems we have procured since World War II. One could not have bought a Sage system, a B–47 system, a B–52 system, a Nike Hercules system, a Polaris system, and so on. None of these systems would have been feasible at the $5 or $6 billion budgets per service which were, roughly, current at that time.

As a result of this authorization, the Air Force budget was increased by about a factor of 5. The other two services had an increase of about 3. As a result, a whole new range of possibilities opened up for the services.

I can easily envisage a scenario for crisis in the future which involves military budgets of $500 billion or more. That would change, if you will, the whole character of strategic planning. I do not expect any such situations to arise with high probability, but I do not consider it paranoia or unwise to prepare for such situations.

Probably an even better prototype for the situation we are thinking about is pre-World War II. After World War I, much of the world became sick of war, and war became "unthinkable" to most people, particularly in the victorious "Allied Powers." Strategists and publicists talked about poison gas and knock-out blows; they thought all the capital cities would be destroyed by poison gas in the first few days of a war. They did not understand the idea of limitations in warfare—of mutual deterrence even after hostilities have broken out.

When Hitler got elected in 1933, people became interested in larger defense budgets. Then he marched into the Rhineland and, of course, defense budgets increased slightly. Then there was the Anschlus and then Munich, and more substantial increases in military budgets. With the invasion of Czechoslovakia, everybody got deeply concerned. Then, finally, there was the invasion of Poland, the formal declaration of war and then 7 months of more or less "phony war." As a result there was opportunity on both sides for 7 months' of full-time war production, before the war really opened up.

We would argue that similar possibilities should be considered today. Nobody is interested in jumping into a nuclear war today. Nobody is going to want to execute the usual picture of nuclear war, in which each side presses every button and goes home. It is extraordinarily difficult to believe such a scenario.

It might happen. But I would be willing to bet, if this were a betting matter, 50 to 1 against it.

On the other hand, the situation might arise in which there was a declaration of war, followed by a phony war, or a serious confrontation in which there were credible threats of war. By the way, in such a confrontation, the following dialog tends to occur.

Both sides are saying to the other side, "There is absolutely nothing at risk which justifies this terrible danger to which we are subjecting each other and the rest of the world. It is clear that whatever we are arguing about is simply not worth the risk of a thermonuclear war. Therefore, one of us has to be reasonable—and it isn't going to be me."

That is, by the way, a terribly persuasive argument.

At this point, each side is trying to explain why the other side should be reasonable. You don't have to have a great defense to do that. All you have to be able to do is say, "I believe my defense establishment is better than yours, in important ways."

I can imagine the Russians telling us. "You are telling us the money we spent on our defense establishment does us no good, but we spent it because we thought it does do good. We believe that this defense establishment of ours works. You don't, but we believe it does."

If you can get that point across, you are going to put great pressure on the other side to back down.

Senator PROXMIRE. Very strong chance of what? I missed that.

Mr. KAHN. If we believe that they believe they have confidence in their establishment, we are going to back down, whether or not their

confidence is justified, because we would be destroyed almost as much as a result of their mistaken belief as by a correct one. If the other man can give you a credible picture, that he believes he has a serious edge over you, then even if he does not objectively have that edge, you may be in trouble.

That is even more true for allies. If they think the other side believes it has an edge, the allies are going to hedge. Finally it is even more true for neutrals that in a bargaining situation the strategic balance is very complex (which should be an obvious point) and the outsider is likely to be excessively influenced by appearances. Who strikes first and how many are dead in each city are almost irrelevant to many of these issues.

Finally, a last point. When we write scenarios for nuclear war, we find it difficult to write a credible scenario which doesn't involve months or weeks of warning. I would guess we are as good at writing scenarios as anybody in the world. We have certainly written as many.

I want to warn the committee, on the other hand, that when we looked at World War I, we didn't find that scenario plausible. The mere fact we can't write a plausible scenario for a war doesn't mean it can't occur, because one can find historical examples to the contrary.

Nevertheless, every scenario we write for nuclear war involves days, weeks or months of tension. Evacuation, last moment mobilizations are extraordinarily possible. By the way, evacuations occur not as a result of secret intelligence or in any attempt to try to outrun the missiles or the bombers. The *New York Times* and the *Washington Post* provide the warning perhaps days before the attack. People or governments then get frightened and decide to decrease their vulnerability to attack. The idea is, can you exploit such warning if it is printed in the papers?

[Complete statement follows:]

SUMMARY PAPER AND BRIEFING NOTES ON THE POTENTIAL OF THE DEFENSE MOBILIZATION BASE CONCEPT BY HERMAN KAHN, WILLIAM BROWN, AND WILLIAM SCHNEIDER, JR.

This submission is the responsibility of the authors and is not to be construed as representing any official opinions of the Hudson Institute or any other associated individuals or agencies.

PREFATORY NOTE

The following paper represents a summary of studies developed by the staff and consultants of the Hudson Institute more or less continuously over the last fifteen years although naturally it focuses more intensively upon recent work—in particular, a summary of a report on the concept of mobilization warfare by Herman Kahn and William Schneider, Jr. Most of Hudson's program of civil defense and mobilization base studies has been accomplished under the direction of William Brown, Herman Kahn and William Schneider, Jr. and at least half the Institute's personnel have participated in one or more of them. This particular submission was prepared as a joint paper by the three people named above.

MOBILIZATION WARFARE

1. The concept of mobilization warfare

The notion of mobilization in a nuclear age has the appearance of a contradiction in terms when arrayed against the conventional concept of mobilization. Mobilization has in general, been associated with the redirection of national resources, both human and material away from traditional civilian pursuits to support a defense effort. To some extent, it has been possible to conceive of a limited mobilization of military forces and associated national resources to support

limited political objectives although the more traditional perception has been associated with a general mobilization of the entire industrial might and armed forces of a nation.

The possibility of intercontinental strategic nuclear attack made possible through the development of ICBM's, missile firing submarines, and long-range bombers have made the initiation and conclusion of a nuclear conflict appear to be a matter of hours or days, and certainly not more than a few weeks in duration, making the traditional notion of mobilization appear to be as archaic and obsolete as the forces and weapons that had been in the past, mobilized.

This study is intended to advance the concept that mobilization is an important component of strategic nuclear conflict, and, we will argue, is likely to be the prototype of any U.S.-Soviet nuclear conflict should such a conflict occur. The concept can be most simply characterized from the perspective of the following simple generalized scenario: During a period of intense political crisis between the U.S. and the Soviet Union, both sides fear that a nuclear war may actually occur. However, neither side is willing to risk the consequences of a nuclear war with the existing levels of forces and defenses (military and civilian). As a consequence, each of the parties attempts to develop on a frantic basis, a very large-scale effective nuclear offense and defense capability which is associated with genuine fears about the possibility of a general war. The period of mobilization during and after an intense political crisis characterizes what we describe as "mobilization warfare." It is warfare in the sense of an intense and bitter competition of an accelerated arms race, but without the certainty that direct military action will occur. A plausible outcome of this scenario is that the side which mobilizes most effectively within a relatively brief period of time (say six months to two years) can achieve a dominant position capable of inhibiting the diplomatic efforts of the other.

The notion of "mobilization warfare" is not restricted only to strategic nuclear warfare. It is also applicable, for example, to a U.S.-Soviet struggle in Europe in which an intense political crisis raises the specter of an outbreak of conventional warfare between the two nations without the expectation that such a conflict would lead to a strategic or tactical nuclear exchange.

Perhaps the closest parallel to mobilization warfare during the nuclear era arose as a consequence of the Korean war. The ominous character of Soviet foreign policy following World War II culminated in the Soviet sponsored attack of North Korean forces against the Republic of Korea. The direction in Soviet foreign policy after World War II was not offset by any rebuilding of U.S. military power which had been rapidly dismantled after the end of World War II. However, when the Soviets authorized the attack on Korea, the change in U.S. attitudes regarding preparedness for a U.S.-Soviet strategic nuclear contingency was electric. One measure of the character of this concern, a measure characteristic of a serious mobilization, was the decision of the Congress to increase annual defense expenditures from $16 to the $60 billion authorized after the outbreak of the Korean war. This vast increase in authorized expenditure made possible a set of strategic programs that were simply not feasible within the prior U.S. defense budget. The new authorization made possible the B–52, the B–47, the Polaris Program, and Atlas Program and a host of related technological initiatives whose consequences are still influencing the shape of the U.S. strategic program today. It also developed a reasonable (for the time) civil defense program designed to move the more vulnerable portions of the home population rapidly to safer areas. As a consequence of this enormous build-up of strategic nuclear capability arising out of the concern over a possible U.S.-Soviet nuclear conflict in the early 1950s, the United States achieved for more than a decade a stark nuclear superiority over the Soviets. This superiority was so vast that in retrospect it appears clear that the Soviets were almost totally deterred from attempts to exert military power in support of their diplomatic objectives throughout the late 1950s and early 1960s.

In the early 1950s the Soviets also attempted to develop a larger strategic program, but were much less successful than the United States. This form of mobilization warfare, we argue, is more likely to become a "standard" mode of nuclear conflict with the Soviet Union than the commonly anticipated mode, namely a large-scale exchange of nuclear weapons.

Perhaps the most significant difference between traditional mobilization concepts and the concept of "mobilization warfare" that is the focus of this paper is that in a modern mobilization, the adequacy of a period of mobilization may be "tested" only in the sense that it can affect the perceptions of an opponent without

a shot being exchanged. Moreover, the period of mobilization in the modern era might be considerably more compressed and complicated than any which we have experienced in this century. In a very practical sense, the mobilization of Germany and the allied powers before the first World War was a traditional process which extended over a period of many years, although the most intense efforts took place after the initiation of the conflict. Similarly, the German and Japanese pre-war mobilization of their forces occurred over many years. In both cases, a large-scale and protracted conflict followed. Under modern conditions, a nuclear conflict between major powers is likely to be short compared to previous conflicts or to any period of mobilization.

The concept of mobilization warfare in a nuclear era implies relatively short reaction times with the ability to deploy major offensive as well as active and passive defensive systems which may be extremely costly and complex by any prior standards. Under such circumstances, it is entirely plausible that the U.S. strategic budget alone could constitute an expenditure of several hundreds of billions of dollars per year. Expenditures at such huge levels make possible a very wide range of military and non-military defense systems that could not be seriously considered with recent strategic budgets—less than $10 billion.

For example, potentially high grade missile defense systems employing lasers, particle beam technology and other advanced concepts for boost phase, mid-course, and terminal interception could, in principle, be procured under conditions of "mobilization warfare." The crucial determinants for acquiring such a capability lies in the prior research and development program and in proper institutional orientation toward a mobilization potential. The requirements of a "mobilization base" to support the notion of mobilization warfare is sufficiently different from the objectives of existing research and development needed to support current and near-term defense requirements that expenditures for a mobilization base should be partitioned from other R&D expenditures. The primary function of a mobilization base is to facilitate the shortening of lead times to procure highly effective strategic forces, active defenses, and civilian protection, should a decision to procure such a capability be made in a context that requires such a build-up be completed in an extraordinarily short period of time (short, that is, by the standards of recent experience). Under some circumstances, it is sufficient simply to have "paper plans" say, for the conversion of designated industrial potential from civilian to military uses. In other cases, where the requirements are more critical, and less easily adaptable to short-term changes, some limited development or prototyping may be necessary. In still other cases, particularly where the function is highly complex and likely to involve large numbers of both civilian and military personnel, such as an ABM or civil defense system, it may be necessary to conduct a limited deployment or field testing, and to develop the professional cadres who could support a vast expansion if and when circumstances require such expansion. The decision as to what elements of a potential U.S. strategic posture should be most extensively or rapidly developed would depend upon the contribution such efforts would make to reducing the lead times necessary to deploy the capability during a period of intense mobilization. The United States already possesses a substantial infrastructure for the rapid short-term expansion of U.S. strategic forces. With relatively modest expenditures, it should be possible to dramatically improve the ability of the United States to mobilize rapidly during an appropriate crisis to increase strategic nuclear forces, its active and passive defenses, and its general purpose forces without the protracted lead times that we have tended to become accustomed to over the past two decades.

2. A baseline mobilization warfare scenario

The implausibility of a U.S.-Soviet strategic nuclear exchange in recent politico-military circumstances has tended to obscure the fact that there are numerous possibilities for a major clash of interests between the superpowers; and consequently, for escalation.

The scenario proposed here arises out of the Achilles' heel of the Soviet Union, the behavior of their East European satellites, in this case, East Germany. Internal dissension develops beyond the control of the local and Soviet political and military leadership in East Germany to the point where large-scale border crossing into West Germany by deserting elements of East German armed forces involve the NATO nations. Unlike the standard escalation scenario where such events lead ultimately to a U.S.-Soviet nuclear exchange, the potential escalation, itself, becomes a force for restraint.

21

TYPICAL STRATEGIC MOBILIZATION SCENARIOS

Of the four scenarios given below, the first two are history, the third used to be the great fear of NATO, and the fourth is probably the great fear of the Warsaw Pact.

1. The "phony war," 1940 (5 months) :
(a) Pre-crisis arms competition (UK, France, Germany and the U.S.S.R.).
(b) A major series of political-military crisis—
Militarization of the Rhineland (1936) ;
Anschluss (Austria) (1938) ;
Sudeten crisis (1938–39) ;
War in Poland (1939).
(c) De-escalation and negotiation (antagonists began a rapid buildup fearing a resumption of full scale conflict).
2. Korea (1950–53) :
(a) Pre-war politico-military crises—
Soviet invasion of Iran (1946) ;
Soviet takeover of East European nations (1945–48) ;
Berlin blockade (1948) ;
Soviet intervention in Turkey and Greece ;
Soviet military buildup, post WW-II.
(b) Major turnabout in U.S. policy—
Factor of four increase in defense expenditures in 18 months ;
Massive emphasis on strategic preparedness, especially active defense.
3. Successful Soviet attack on W. Berlin and subsequent de-escalation.
4. Uprising in East Germany gets out of control and escalates.

22

CHARACTERISTICS OF A SPECIAL MOBILIZATION SCENARIO: A FORMAL DECLARATION OF WAR BY THE U.S.

1. The declaration would have solemn and especially great significance for our enemies, allies, and neutrals.
2. The information transferred would have:
(a) Unambiguous factual content of great importance ;
(b) Undeniable implications and symbolism ;
(c) Highly uncertain interpretations or implications.
3. Its existence would preempt "ordinary" crisis negotiation and deny the stability of any recent *fait accompli.*
4. In some extreme crises it could be temporizing—a declaration is not a spasm response—and lead to deescalation of actual fighting.
5. But it implies a rapid response to any increased use of force.
6. It tends to force a decision by allies to cooperate actively.
7. It would justify many peripheral actions (blockades, interdiction, property confiscation, internment of hostile aliens, etc.).
8. It would tend to unify the national response—and increase defense spending enormously through mobilization.
9. It would convey the unambiguous message that a *formal* peace treaty will be required to settle all the important issues.

ROLE OF RESEARCH FOR MOBILIZING ACTIVE DEFENSES

1. Missile defense probably would be the most important and expensive effort.
2. Lead-time reduction becomes extremely important.
3. A program is required to facilitate rapid massive procurement of mutually reinforcing systems—
Boost phase interception ;
Mid course interception ;
Terminal interception.
4. A capability may soon be needed to support a war in space.
5. A capability is required for integration into other—high priority strategic mobilization programs—
Air defense ;
Civil defense.
Major research objective: design systems which are highly effective, mutually supporting and which can be rapidly deployed at high levels of expenditure.

Appendix I

Paul Henry Nitze

In the spring of 1969, Paul Henry Nitze was appointed the representative of the Secretary of Defense to the United States Delegation to the Strategic Arms Limitation Talks with the Soviet Union; a position he held until June 1974, at which time he resigned.

Mr. Nitze resigned from his duties as Deputy Secretary of Defense on January 20, 1969, a position he had held since July 1, 1967, succeeding Cyrus R. Vance.

Mr. Nitze was serving as 57th Secretary of the Navy when he was nominated by former President Lyndon B. Johnson on June 10, 1967, to become Deputy Secretary of Defense. He was confirmed by the United States Senate on June 29, 1967.

The late President John F. Kennedy nominated Mr. Nitze to be Secretary of the Navy on October 14, 1963. At that time he was serving as Assistant Secretary of Defense (International Security Affairs), having assumed that position on January 29, 1961. He began his duties as Secretary of the Navy on November 29, 1963.

Graduated "cum laude" in 1928 from Harvard University, Mr. Nitze subsequently joined the New York investment banking firm of Dillon Read and Company. In 1941, he left his position as Vice President of that firm to become financial director of the Office of the Coordinator of Inter-American Affairs.

From 1942–1943, he was Chief of the Metals and Minerals Branch of the Board of Economic Warfare, until named as Director of Foreign Procurement and Development for the Foreign Economic Administration.

During the period 1944–1946, Mr. Nitze was Vice Chairman of the United States Strategic Bombing Survey. He was awarded the Medal of Merit by President Truman for service to the nation in this capacity.

For the next seven years, he served with the Department of State, beginning in the position of Deputy Director of the Office of International Trade Policy. In 1948, he was named Deputy to the Assistant Secretary of State for Economic Affairs. In August, 1949, he became Deputy Director of the State Department's Policy Planning Staff, and Director the following year.

Mr. Nitze left the federal government in 1953 to become President of the Foreign Service Educational Foundation in Washington, D.C., a position he held until January 1961.

Mr. Nitze is Chairman of the Advisory Council of The Johns Hopkins School of Advanced International Studies in Washington, D.C., and also serves on the Board of Trustees of the University. He holds memberships on the Board of Directors of Schroders, Inc., in New York, and Schroders, Ltd., in London, The American Security and Trust Company of Washington, D.C., Northwestern Mutual Life Mortgage and Realty Investors of Milwaukee, Wisconsin, and is Chairman of the Board of the Aspen Skiing Corporation.

Herman Kahn

Herman Kahn was born in Bayonne, New Jersey, in 1922. He received a B.A. from UCLA in 1945 and an M.S. in physics from the California Institute of Technology in 1948. He was associated with the Rand Corporation before becoming in 1961 the principal founder and director of the Hudson Institute, a research organization studying public policy issues, with headquarters in Croton-on-Hudson, N.Y. His international reputation as a strategic warfare analyst or, as the *New Republic* put it, one of "the prophets of strategic reality," is based on his work at the Institute and on his books: *On Thermonuclear War* (1960), *Thinking about the Unthinkable* (1962), *On Escalation* (1965 and, revised Pelican

Statement of E. P. Wigner [1] for the Joint Committee on Defense Production

[1] Dr. Wigner is a Nobel Laureate and an emeritus professor of physics at Princeton University and has long been associated with civil defense issues. He edited a 1968 study *Who Speaks for Civil Defense?*

THE EFFECTIVENESS OF CIVIL DEFENSE

This writer became convinced of the possible effectiveness of civil defense measures when he served as a member of the General Advisory Committee to the U.S. Atomic Energy Commission.

Are the U.S.S.R. and China the only countries with elaborate and well developed civil defense systems? No—most of the peace-loving countries also have such systems, based on blast shelters, and their yearly expenditures per person on such defense is about 15 times greater than ours. This has been, so far, about 40¢ per person a year. Incidentally, the Swiss civil defense repeats our President Kennedy's message: (Civil defense) "is insurance we trust, will never be needed"—its greatest accomplishment is, according to the Swiss, that it will *not* have to be used, that it will divert the aggressive instincts of possible opponents.

It is easy to conclude that an effective civil defense is not only desirable, it is also possible.

IS CIVIL DEFENSE NECESSARY?

What is the principal danger that threatens us in the present absence of an effective civil defense? It is the possibility of the U.S.S.R. evacuating its cities, dispersing their population, and then making demands on us, under the threat of a nuclear attack, approximating those made by Hitler or Czechoslovakia which led to the Munich pact. This left Czechoslovakia essentially defenseless.

THE ARGUMENTS AGAINST CIVIL DEFENSE

The argument which we heard after the U.S.S.R. civil defense efforts became generally apparent was that our installation of protection for our people would only induce the U.S.S.R. to augment its aggressive capability. We now know that such augmentation took place even though we did not organize a vigorous civil defense effort. One of the two arguments we now hear, the civil defense is too expensive, seems almost ridiculous. If Switzerland, Sweden, etc., *even China*, can afford the more costly, the blast shelter method, we with the highest per capita national wealth, can also surely afford the defense of our people. The other argument, in the words of one of the most learned opponents of civil defense, S. Drell, is that it would lead to an "escalation of the apprehension from the mood of today, vis-a-vis the dangers of a nuclear exchange between the U.S. and the Soviet Union." Should the apprehension of the danger not be greater now, where we have no effective defense, than it would be when we have such defense? Or is it proposed that we should lull the common people into ignorance of the true situation? It is remarkable also that the U.S.S.R. is not criticised for fostering the "apprehension" of its own people. One must conclude that the varying arguments against civil defense have little validity.

The first change I would advocate is to stop maintaining that a nuclear war would be the end of mankind. Such a statement may give the impression to an opponent that he can achieve anything by threatening with a nuclear war. After all, he would argue, the opponent (that is us) will make any sacrifice to avoid the "end of mankind". Hence, if he is threatened with extinction he will give in, particularly if the threat comes from a party which does not believe that the war precipitated by him will lead to the "end of mankind". Instead of such a blatantly incorrect statement, it would be better to subscribe to Chuykov's doctrine that "knowledge and the skillful use of modern protective measures" will make it possible to provide effective protection. At least, we could adhere to Kissinger's earlier (1957) statement: "While it (civil defense) cannot avert the traumatic effect of vast physical destruction, its efficient operation may make the difference between the survival of a society and its collapse."

The second measure which I consider to be urgent is to establish better contact with the people at large. This makes it desirable for DCPA to expand its staff by the employment of people who can establish a contact with the population at large, who can speak and write the truth convincingly. One of the functions of these advisors would be to help the high schools to give instruction on the nature of nuclear explosions and the defense against the effects of these. This is a subject which is foreign to most present high school teachers, and the advisor could and should help them to acquire the necessary knowledge. After all, the Federal Government now intends to support the local schools and can well suggest that these contribute to the protection of the country. The high school instruction on civil defense—obligatory in the U.S.S.R.—would be very useful since, after all, we learn best when we are young and we learn most non-elementary facts from our teachers. But even more generally, the establishment of a close contact between those who protect our freedom, and those whose freedom is protected, would be very desirable; and acquainting people at large with the methods and effectiveness of civil defense would provide an avenue toward this goal. It may not be easy to find people who know about the methods and effectiveness of civil defense and who are also able and interested in communicating this and much other knowledge to the people at large, but every effort should be made to find such people and support them.

The last suggestion I wish to make is that the DCPA budget should certainly not be cut. It should steadily be increased until, in a few years, it reaches the per capita level of other peace-loving and non-expansionist countries, such as Switzerland, Holland, Sweden, etc. For reasons given in the rest of my statement, this would be of decisive importance for maintaining a valid, widely endorsed, and vigorous defense effort for our country—and it would support all freedom-directed nations. Their independence does depend to a certain degree on our strength and our ability to stand up for them. The examples of Hungary, Czechoslovakia, Poland—to mention only a few—show that such independence does not come freely.

Let me end on a bit more hopeful tone which is, however, as sincere as was the rest of my statement. This is the hope that an effective civil defense may not only protect our country and our freedoms, but it may

also lead to a more true peace than the present one, which is based on the fear of destruction. I hope such a peace in which no rulers are tempted to increase their domains will come into being!

Statement of Gerard C. Smith [1]

I propose to discuss this morning some of the arms control implications of Vladivostok as well as certain related aspects of the current Defense budget submission.

I. THE VLADIVOSTOK ACCORD

At the start let me say that I put forward these ideas tentatively, not categorically. I question that anyone can speak with certainty about the slippery issues surrounding strategic arms and their control. I admit to a bias in favor of a very strong defense but I believe that arms control can also advance the security of the United States and the world whether or not there is some relaxation of tensions between the U.S. and the U.S.S.R.

The Vladivostok accord should not be judged in and of itself—but in connection with the limit on defensive systems (ABMs) agreed upon in 1972 and other American-Soviet agreements relating to arms control. It may help in judging the significance of Vladivostok to see that accord as part of a process that has been going on for more than five years. The general strategic dialog of the 1960s led to the specific SALT exchanges of 1969–72 at Helsinki, Vienna, Washington, and Moscow. Gradually the two sides developed somewhat better understanding of each other's strategic preoccupations. Concerns about accidental or miscalculated nuclear hostilities led to the first two SALT agreements in 1971—on measures to reduce the risk of outbreak of nuclear war and on measures to improve the Washington-Moscow direct communication link or "Hot Line." In 1972 there was the major breakthrough, the treaty limiting ABMs to two sites apiece, accompanied by the interim agreement to freeze offensive launches at the approximate levels of 1972. These were followed in 1973 by the Nixon-Brezhnev agreed principles for offensive arms limitation and in 1974 the ABM Treaty levels were reduced to one site apiece. At year's end the Vladivostok accord foreshadowed limitations on offensive systems which although of relatively short duration may be considered as a counterpart of the ABM Treaty. In judging this latest agreement one should consider the cumulative effect of the entire SALT process which hopefully can be considered as a preparatory stage for the natural next steps—reduction in offensive force levels which the sides are now committed to negotiate and some limitation on improvements in weapons characteristics. A total ban on ABM systems should also be reconsidered.

I would not favor interrupting the current Geneva negotiations by introducing a proposal for reductions. I do not believe that reductions are negotiable now. The Soviet position since 1968 has called for first a limitation and subsequently for reductions. When and if

---

[1] Mr. Smith is the former Director of the U.S. Arms Control and Disarmament Agency and chief U.S. representative in SALT I. He is now in private practice with the law firm of Wilmer, Cutler, and Pickering. His statement submitted to the Joint Committee was originally delivered to the Senate Foreign Relations Committee in April 1975.

(Gross exaggerations, assuming Nevada desert type terrain with no thermal shadows by city skylines, no duck and cover, no clothing and fraudulent blast effects data which ignores Hiroshima's evidence)

Appendix III

U.S. CIVILIAN NUCLEAR FATALITY ESTIMATES[1] FOR VARIOUS COUNTERFORCE ATTACK SCENARIOS

Type of attack	Assumptions	Estimated fatalities
Comprehensive attack:		
Case 1, 60 percent destruction of military targets.	1 optimum height of burst and 1 surface burst warhead per each of 1,054 ICBM silos; pattern attack of SAC bases: unspecified attack on 2 SSBN support bases; good shelter posture.	3, 200, 000
Case 2, 60 percent destruction of military targets.	2 optimum height of burst warheads per each of 1,054 ICBM silos; no pattern attack of SAC bases; unspecified attack on 2 SSBN support bases; poor shelter posture.	6, 700, 000
Case 3, 57–60 percent destruction of military targets.	2 surface burst warheads per each of 1,054 ICBM silos; pattern attack of SAC bases; unspecified attack on 2 SSBN support bases; very poor shelter posture.	16, 300, 000
ICBM only attack:		
Case 1	2 550 kt optimum height of burst warheads per each of 1,054 ICBM silos.	[2] 4, 000, 000
Case 2, 42 percent silo destruction.	1 550 kt surface burst and 1 550 kt optimum height of burst warhead per each of 1,054 ICBM silos.	5, 600, 000
Case 3, 80 percent silo destruction.	1 3 Mt surface burst and 1 3 Mt optimum height of burst warhead per each of 1,054 ICBM silos.	18, 300, 000
Case 4	2 3 Mt surface burst warheads per each of 1,054 ICBM silos	[3] 20, 000, 000
Airlift attack:[4]		
Case 1	1 200 kt cruise missile warhead per each of 5 U.S. heavy airlift bases (Dover AFB, Del.; McGuire AFB, N.J.; Travis AFB, Calif.; Charleston AFB, S.C.; and McChord AFB, Wash.)	70, 000
Case 2	1 1.2 Mt SLBM per each of 5 U.S. heavy airlift bases	210, 000
Case 3	1 1.2 Mt SLBM per each of 5 U.S. heavy airlift bases uses offset targeting.	135, 000

[1] Department of Defense estimates as reported to the Senate Foreign Relations Committee, July 11, 1975, and published in "Analyses of Effects of Limited Nuclear War," pp. 12–24. Note that figures are fatalities only and not casualties and that attacks are restricted to military facilities (counterforce) rather than populated areas (countervalue). Shelter posture is a function of degree of hardening and the willingness of the population to use shelters.

[2] Under.

[3] Circa.

[4] Assumes allied victories in a European war supported by U.S. military airlift provide incentives for destruction of major American airlift centers.

Survival of the Relocated Population of the U.S. After a Nuclear Attack

FINAL REPORT • JUNE 1976 ORNL-5041

by
Carsten M. Haaland
Conrad V. Chester
Eugene P. Wigner

for
Defense Civil Preparedness Agency
Washington, D. C. 20301

OAK RIDGE NATIONAL LABORATORY

SURVIVAL OF THE RELOCATED POPULATION OF THE U.S. AFTER A NUCLEAR ATTACK

C. M. Haaland, C. V. Chester, and E. P. Wigner

ABSTRACT

The feasibility of continued survival after a hypothetical nuclear attack is evaluated for people relocated from high-risk areas during the crisis period before the attack. The attack consists of 6559 MT, of which 5951 MT are ground bursts, on military, industrial, and urban targets. Relocated people are assumed to be adequately protected from fallout radiation by shelters of various kinds. The major problems in the postattack situation will be the control of exposure to fallout radiation, and prevention of severe food shortages to several tens of millions of people. A reserve of several million additional dosimeters is recommended to provide control of radiation exposure. Written instructions should be provided with each on their use and the evaluation of the hazard. Adequate food reserve exists in the U.S. in the form of grain stocks, but a vigorous shipping program would have to be initiated within two or three weeks after the attack to avoid large scale starvation in some areas. If the attack occurred in June when crops on the average are the most vulnerable to fallout radiation, the crop yield could be reduced by about one-third to one-half, and the effects on crops of possible increased ultraviolet radiation resulting from ozone layer depletion by nuclear detonations may further increase the loss. About 80% of the U.S. crude refining capacity and nearly all oil pipelines would be either destroyed or inoperative during the first several weeks after an attack. However, a few billion gallons of diesel fuel and gasoline would survive in tank storage throughout the country, more than enough for trains and trucks to accomplish the grain shipments required for survival. Results of a computer program to minimize the ton-miles of shipments of grain between Business Economic Areas (BEAs) indicate that less than 2% of the 1970 rail shipping capacity, or less than 6% of the 1970 truck shipping capacity would be adequate to carry out the necessary grain shipments. The continuity of a strong federal government throughout the attack and postattack period is essential to coordinate the wide-scale interstate survival activities.

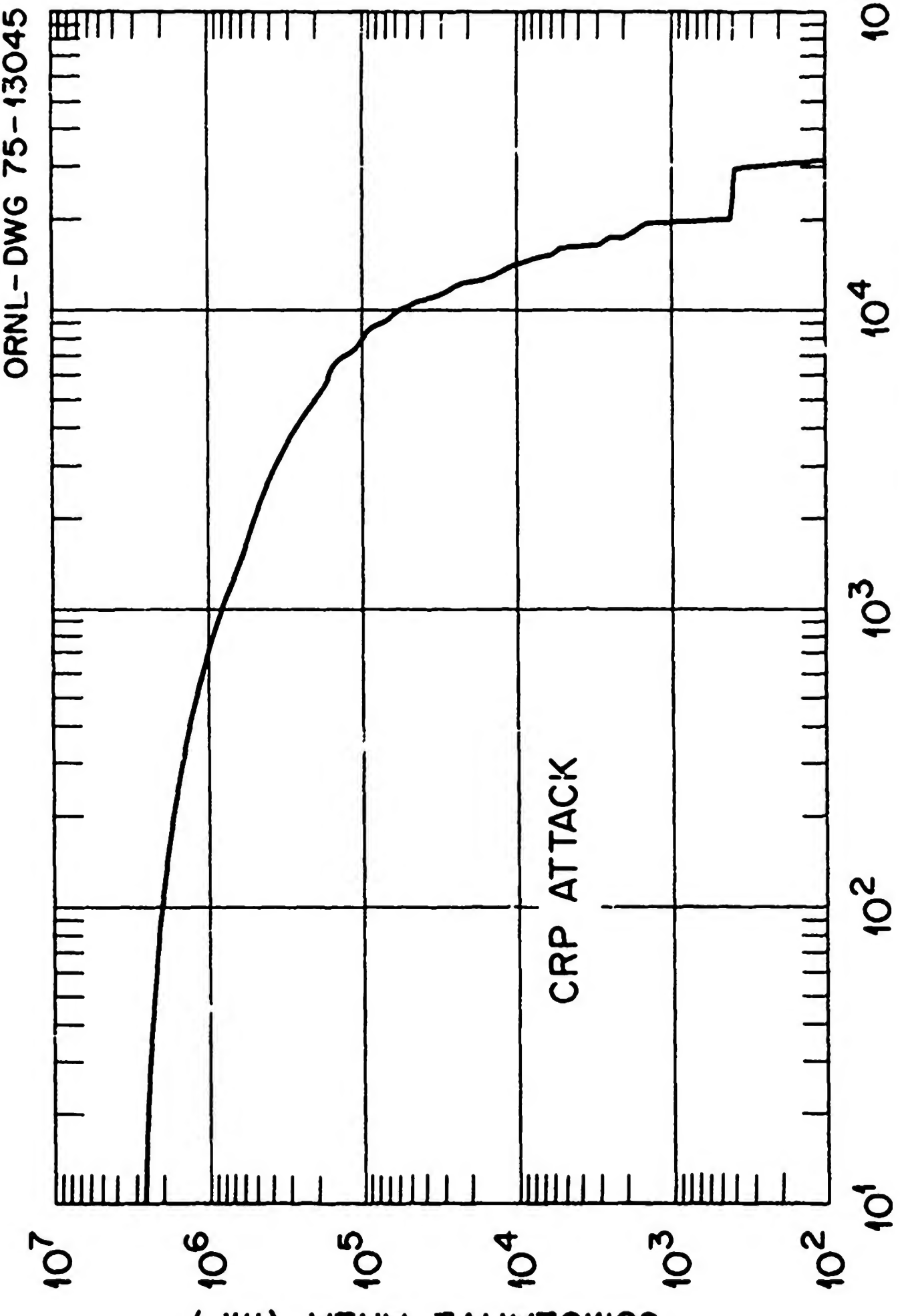


Fig. 4.2 Area of U.S. as a Function of Unit-Time Reference Dose Rate.

Environmental Radiation Protection Factors
Provided by Civilian Vehicles

Vehicle	Position	Protection Factor Range
Commercial bus (common type)	Throughout bus	1.5-2.0
Commercial bus (scenic cruiser type)	Throughout bus	1.5-2.0
School bus	Throughout bus	1.5-1.8
Passenger car	Passenger side (chest)	1.5-1.7
	Driver side	1.5-1.7
Pickup	Driver side	1.9-2.1
Crew cab	Driver side	1.8-2.0
	Back seat	1.8-2.0
Carryall	Driver side	1.7-1.9
	Rear side	1.7-1.9
2-1/2-ton truck	Driver side	1.8-2.0
	Center of bed	1.4-1.6
5-ton truck	Driver side	2.0-2.2
	Sleeper	1.9-2.1
Heavy Truck	Driver side	1.4-1.6
	Center of trailer	2.7-3.1
Fire truck	Driver side	2.7-3.1
	Standing area in back	1.6-1.8
Switch engine	Engineer's seat	3.0-3.5
Railway guard car	Sleeping quarters	2.2-2.6
	Kitchen area	2.4-2.8
	Center area	2.0-2.4
Heavy locomotive	Engineer's seat	3.0-3.5

SOURCE: Z. G. Burson, "Environmental and Fallout Gamma Radiation Protection Factors Provided by Civilian Vehicles," Health Physics, 26, 41-44, 1974.

THE WHITE HOUSE

WASHINGTON

#76

~~TOP SECRET~~/SENSITIVE

July 25, 1980

Presidential Directive/NSC-59

TO: The Vice President
The Secretary of Defense

ALSO: The Assistant to the President for National Security Affairs
The Chairman, Joint Chiefs of Staff

SUBJECT: Nuclear Weapons Employment Policy (C)

In PD-18, I directed a follow-on study of our targeting policy for nuclear forces. I have reviewed the results and considered their implications for maintaining deterrence in the present decade, particularly in light of the growing Soviet strategic weapons arsenal and its capabilities. (S)

The most fundamental objective of our strategic policy remains nuclear deterrence. I reaffirm the directive of PD-18 to that effect. The purpose of this directive is to outline policies and actions in the nuclear force employment field to secure that continuing objective. (S)

Our strategic nuclear forces must be able to deter nuclear attacks not only on our own country but also on our forces overseas, as well as on our friends and allies, and to contribute to deterrence of non-nuclear attacks. To continue to deter in an era of strategic nuclear equivalence, it is necessary to have nuclear (as well as conventional) forces such that in considering aggression against our interests any adversary would recognize that no plausible outcome would represent a victory on any plausible definition of victory. To this end and so as to preserve the possibility of bargaining effectively to terminate the war on acceptable terms that are as favorable as practical, if deterrence fails initially, we must be capable of fighting successfully so that the adversary would not achieve his war aims and would suffer costs that are unacceptable, or in any event greater than his gains, from having initiated an attack. (C)

The employment of nuclear forces must be effectively related to operations of our general purpose forces. Our doctrines for the use of forces in nuclear conflict must insure that we can pursue specific policy objectives selected by the National Command Authorities at that time, from general guidelines established in advance. (S)

These requirements form the broad outline of our evolving countervailing strategy. To meet these requirements, improvements should be made to our forces, their supporting C3 and intelligence, and their employment plans and planning apparatus, to achieve a high degree of flexibility, enduring survivability, and adequate performance in the face of enemy actions. The following principles and goals should guide your efforts in making these improvements. (S)

Pre-planned options. The Single Integrated Operational Plan will provide pre-planned targeting for strikes against the Soviet Union, its allies and its forces. It should provide for retaliatory strikes that will be effective, even if the Soviets attack first, without warning, and in a manner designed to reduce our capability as much as possible. It will be developed with flexible sub-options that will permit, to the extent that survival of C3 allows, sequential selection of attacks from among a full range of military targets, industrial targets providing immediate military support, and political control targets, while retaining a survivable and enduring capability that is sufficient to attack a broader set of urban and industrial targets. In addition, to the maximum extent possible, pre-planned options will be provided for selection in response to specific, lesser contingencies (including attacks on Cuba, SRV and North Korea as appropriate). [redacted]

While it will remain our policy not to rely on launching nuclear weapons on warning that an attack has begun, appropriate pre-planning, especially for ICBMs that are vulnerable to a preemptive attack, will be undertaken to provide the President the option of so launching. (TS)

Flexibility. In addition to pre-planned options we need an ability to design nuclear employment plans on short notice in response to the latest and changing circumstances. This capability must be comprehensive enough to allow rapid construction of plans that integrate strategic force employment with theater nuclear force employment and general purpose force employment for achieving theater campaign objectives and other national objectives when pre-planned response options are not judged suitable in the circumstances. (S)

To assure that we can design such plans, our goal should be to have the following capabilities on a continuing basis in peacetime, during crises, and during protracted conflict:

-- Staff capabilities, within all unified and specified commands which have nuclear forces, to develop operational plans on short notice and based on the latest intelligence.

-- Staff capabilities at the seat of Government to support the NCA for coordinating and integrating the nuclear force employment for all commands.

-- Intelligence and target development capabilities which permit damage assessment and acquisition of a broad range of targets, fixed and mobile, on a timely basis for military operations. (S)

Reserve Forces. Pre-planned options should be capable of execution while leaving a substantial force in secure reserve and capable of being withheld for possible subsequent use. The forces designated for the reserve should be the most survivable and enduring strategic systems consistent with the need for a flexible and varied reserve force capable of being effectively employed against a wide target spectrum and withheld if necessary for a prolonged period. The secure reserve force will be increased over the next two years to support a more flexible execution of our countervailing strategy. This will be done according to the Secretary of Defense's guidance. (TS)

Targeting categories. Overall targeting planning appropriate to implement a countervailing strategy will result in a capability to choose to put the major weight of the initial response on military and control targets. Military targets must be selected for the purpose of destroying enemy forces or their ability to carry out military operations. Strategic and theater nuclear forces should to the extent feasible be used in combination with, and in support of, general purpose forces to achieve that objective. (S)

More specifically, the following categories of military targets, with appropriate sub-options for different theaters, should be covered in planning:

-- strategic and theater nuclear forces, including nuclear weapons storage;

-- military command, control, communications, and intelligence capabilities;

-- all other military forces, stationary and mobile;

-- industrial facilities which provide immediate support to military operations during wartime. (TS)

In addition, pre-planned options, capable of relatively prolonged withhold or of prompt execution, should be provided for attacks on the political control system and on general industrial capacity. (TS)

There must be extensive and effective coverage in the pre-planned options of all categories. Methods of attack on particular targets should be chosen to limit collateral damage to urban areas, general

industry and population targets outside these categories, consistent with effectively covering the objective target, and, where appropriate, overall plans should include the option of withholds to limit such collateral damage. (TS)

Command, Control and Communications, and Intelligence. Flexibility in contingency planning and in operations will be highly dependent on our C^3I capabilities, including their ability to acquire targets, assess damage, and survive attack. Strategic stability in an era of essential equivalence depends as much on survivability, endurance and reconstitutability of C^3I capabilities as it does on the size and character of strategic arsenals. (C)

PD/NSC-53 directs that our C^3I programs and our guidance to telecommunications common carriers support the development and maintenance of such capabilities. In addition, PD/NSC-41 directs that we seek greater continuity of government should deterrence fail. Implementation of PD/NSC-53 and PD/NSC-41 must be pursued in parallel with that of this employment directive. (C)

The relationship of acquisition policy to employment policy. Our acquisition programs must be evaluated in terms of their support for the employment policy ordered by this directive. The required flexibility, survivability, endurance, and target destruction capability must be taken into account in developing programs for acquiring nuclear weapons systems, and their supporting C^3I systems, needed to support our countervailing strategy. (S)

Implementation. As new targeting capabilities are developed, and as our operational staffing support change to meet the foregoing directives, they must be reviewed and tested to validate their feasibility and soundness. For that purpose:

-- At least two exercises involving the National Command Authorities should be conducted each year to evaluate our capabilities and our employment doctrines.

-- Continued study and analysis of means to improve and refine our countervailing strategy of general conflict should be conducted by the Department of Defense.

-- The results of these exercises, studies and analysis will provide the bases for modification and any further development of employment and acquisition policy.

-- A report will be rendered to the President at least annually on our employment plans, including, but not limited to, on the size and capability of the reserve forces, the degree of flexibility available,

limiting factors in achieving flexibility, and the status of programs to provide improvements.

-- Any change or new pre-planned options will be submitted to the President for his review and approval, in accordance with current procedures. (TS)

NSDM-242 is superseded by this directive. (U)

Jimmy Carter

NUCLEAR WAR STRATEGY

(Concerning President Carter's 25 July 1980 Presidential Directive PD-59, "Nuclear Weapons Employment Policy")

HEARING

BEFORE THE

COMMITTEE ON FOREIGN RELATIONS

UNITED STATES SENATE

NINETY-SIXTH CONGRESS

SECOND SESSION

ON

PRESIDENTIAL DIRECTIVE 59

SEPTEMBER 16, 1980

(TOP SECRET HEARING HELD ON SEPTEMBER 16, 1980; SANITIZED AND PRINTED ON FEBRUARY 18, 1981)

Printed for the use of the Committee on Foreign Relations

U.S. GOVERNMENT PRINTING OFFICE

70-600 O WASHINGTON: 1981

APPENDIX

Administration's Responses to Questions Submitted Before the Hearing

Question 1. What are the basic strategic targeting priorities in PD–59? How do these differ from previous targeting guidance, particularly that contained in NSDM 242?

Answer. PD–59 specifies the development of plans to attack a comprehensive Soviet/Warsaw Pact target system, with the flexibility to employ these plans, should deterrence fail, in a deliberate manner consistent with the needs of the situation and in a way which will deny an aggressor any gain, or would impose costs which clearly exceed his expected gains. This could entail initial retaliation on military and control targets while retaining the capability either to withhold for a relatively prolonged period, or to execute, broad retaliatory attacks on the political control system and on general industrial capacity. These individual target systems, which we feel the Soviet leaders value most, include leadership and control, military forces both nuclear and conventional and the industrial/economic base. Highlights of targeting aspects include an increased number of situation-oriented options, and more flexibility for selectively attacking all categories of targets.

PD–59 requires the option to attack a full range of industrial/economic targets be retained. PD–59 also places more emphasis on how to improve the effectiveness of targeting retaliation against Warsaw Pact leadership and control, nuclear forces, and conventional forces in a wartime situation. In contrast to some pronouncements by the press, the United States has never had a doctrine based simply and solely on reflexive, massive attacks on Soviet cities. Instead, we have always planned both more selectively (options limiting industrial/economic damage) and more comprehensively (a range of military targets in addition to the industrial/economic base). Previous Administrations, going back well into the 1960s, recognized the inadequacy of a strategic doctrine that would give us too narrow a range of options. The fundamental premises of our countervailing strategy are a natural evolution of the conceptual foundations built over the course of a generation. PD–59 is not a new strategic doctrine; it is not a radical departure from past U.S. strategic policy. Our countervailing strategy, as formally stated in PD–59, is in fact, a refinement, a codification of previous statements of our strategic policy. PD–59 takes the same essential strategic doctrine, and restates it more clearly, more cogently, in the light of current conditions and current capabilities.

Question 2. What are the fundamental political and military objectives for strategic targeting in PD–59? Is it envisaged that the United States could, under certain circumstances, conduct limited nuclear war for foreign policy, political or military objectives? Does the PD–59 envision the possibility of U.S. nuclear retaliation for any provocation short of a nuclear attack on the United States or its allies?

Answer. Deterrence remains, as it has been historically, our fundamental strategic objective. The overriding objective of our strategic forces is to deter nuclear war. But deterrence must restrain an adversary from carrying out any of a far wider range of threats than just that of massive attacks of U.S. cities. We seek to deter any adversary from any course of action that could lead to general nuclear war. Our strategic forces also must deter nuclear attacks on smaller sets of targets in the United States or on U.S. military forces overseas, and deter the nuclear coercion of, or attack on, our friends and allies. Our strategic forces, in conjunction with theater conventional and nuclear forces, must also contribute to deterrence of conventional aggression as well. I say "contribute" because we recognize that neither nuclear forces nor the cleverest theory for their employment can eliminate the need for us—and our allies—to provide a capable conventional deterrent.

In our analysis and planning, we are necessarily giving greater attention to how a nuclear war would actually be fought by both sides if deterrence fails. There is no contradiction between this focus on how a war would be fought and what its results would be, and our purpose of insuring continued peace through deterrence. Nor is there a contradiction between this focus and a judgment that escalation of a "limited" to an "all-out" nuclear war is likely. Indeed, this focus helps us achieve deterrence and peace, by insuring that our ability to retaliate is fully credible. We must have forces, contingency plans, and command and control capabilities that will convince the Soviet leadership that no war and no course of aggression by them that led to use of nuclear weapons—on any scale of attack and at any stage of conflict—could lead to victory, however they may define victory.

Operationally, our countervailing strategy requires that our plans and capabilities be structured to put more stress on being able to employ strategic nuclear forces selectively, as well as by all-out retaliation in response to massive attacks on the United States. It is our policy—and we have increasingly the means and the detailed plans to carry out this policy—to ensure that the Soviet leadership knows that if they chose some intermediate level of aggression, we could, by selective, large (but still less than maximum) nuclear attacks, exact an unacceptably high price in the things the Soviet leaders appear to value most—their military forces both nuclear and conventional, their political and military control apparatus, and the industrial capability to sustain a war. In our planning we have not ignored the problem of ending the war, nor would we ignore it in the event of a war. And, of course, we have, and we will keep, a survivable and enduring capability to attack the full range of targets, including the Soviet economic base, if that is the appropriate response to a Soviet strike.

The United States already retains the option of using weapons in a limited way in response to a conventional attack on us or our allies if necessary. However, PD–59 does *not* propose a first strike strategy. We are talking about what we could and (depending on the nature of a Soviet attack) would do in response to a Soviet attack. Nothing in the policy contemplates that nuclear war can be a deliberate instrument of achieving our national security goals because it cannot be. But we cannot afford the risk that the Soviet leadership might entertain the illusion that nuclear war could be an option—or its threat a means of coercion—for them.

Question 3. What alternative targeting strategies were examined in the studies which preceded PD–59? On what grounds were such alternatives rejected? Was the President presented with alternatives to the targeting policy set forth in PD–59?

Answer. Alternative targeting strategies were addressed. The alternative strategies examined were: (a) strengthen existing policy; (b) focus more heavily on denying Soviets a favorable war outcome; (c) add higher confidence capability against some target systems; and (d) rely more heavily on assured destruction.

Under alternative (a) the forces and related C^3I to accomplish this strategy would be given added endurance.

Alternative (b) placed more emphasis on targeting of Soviet (and non Soviet Warsaw Pact) nuclear and conventional forces to assure that they could not expect to achieve a favorable outcome or a victory, however victory might be defined, while retaining an assured destruction capability.

Alternative (c) would require greater capabilities against certain Soviet forces than in alternative (b).

The last alternative, (d), also would avoid the need to make any improvements to the flexibility and endurance of strategic forces and C^3I.

Each of the alternatives was considered in light of: (a) what flexibility in our nuclear posture (i.e., how broad a range of options) is desired; (b) how much endurance do our forces and C^3I require; (c) how much capability is considered necessary; (d) costs of achieving these capabilities.

These considerations were weighed against the ability of each of the alternatives to deter the Soviets, taking into account Soviet attitudes toward concepts of nuclear war and perceptions of our capabilities and will, as well as the perceptions of our friends and allies. In the final analysis, a policy was selected which was judged to be most realistic considering the current relationship between the U.S. and the U.S.S.R., and the world situation, and considering the continued aggressive pursuit by the Soviets of comprehensive improvement in all aspects of military force capabilities, both nuclear and conventional.

A belief in the continuing utility of war as a policy instrument and the need for military superiority fit well into Soviet discussions of victory in a global conflict. It should be noted that Soviet civilian leadership has made statements as to the destructiveness of nuclear war and the need for U.S.-U.S.S.R. arms control measures. At the same time, it is appropriate to take note of high level Soviet statements which tend to point to a somewhat different direction. For instance, the Chief of the Soviet Strategic Missile Forces has observed that:

> The imperialist ideologists are trying to lull the vigilance of the world's people by having recourse to propoganda devices to the effect that there will be no victors in a future nuclear war. These false affirmations contradict the objective laws of history . . . Victory in war, if the imperialists succeed in starting it, will be on the side of world socialism and all progressive mankind. (Marshal of the Soviet Union N. I. Krylov, "The Instructive Lessons of History", *Sovetskaia Rossiia*, August 30, 1969, UNCLASSIFIED).

President (and Marshal of the Soviet Union) Brezhnev is also on record as saying that:

> Let it be known to all that in a clash with any aggressor the Soviet Union will win a victory worthy of our great people, of the homeland of the October Revolution. (L. I. Brezhnev, Speech on the 50th Anniversary of the October Revolution, *Pravda*, November 4, 1967, UNCLASSIFIED).

In addition to such doctrinal presentations, the Soviet leaders make evident through their programs their concerns about the failure of deterrence as well as its maintenance, and their rejection of such concepts as minimum deterrence and assured destruction as all-purpose strategic theories. As Secretary Brown has indicated, what is most troublesome is the heavy emphasis in Soviet military doctrine on the acquisition of war-winning (whatever the duration of the conflict) capabilities, and the coincidence (in one sense or another of the word) between their programs and what have been alleged as the requirements of a deliberate war-winning strategy. This compilation of Soviet sources—which could be added to almost indefinitely—is sufficient to demonstrate that the Ogarkov quotation used in the speech quoted in the question was not an aberration. There are, to be sure, quotations to be found that indicate different views—partly because there are no doubt different views within the Soviet system, more often because they are addressed to different audiences. There is no question that the Soviet leadership understands that nuclear war would be immensely destructive and uncertain; it is to re-inforce that perception—and to add to it the conclusion, found only very infrequently if at all in public statements, that the U.S.S.R. could not fight and win such a war—that the countervailing strategy is directed.

O

~~TOP SECRET~~

DEPARTMENT OF DEFENSE

POLICY GUIDANCE FOR THE EMPLOYMENT OF NUCLEAR WEAPONS (NUWEP) (U)

OCTOBER 1980

OFFICE OF THE SECRETARY OF DEFENSE
THE PENTAGON
WASHINGTON, D.C. 20301

~~TOP SECRET~~

~~CONFIDENTIAL~~

THE SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

24 OCT 1980

MEMORANDUM FOR THE SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
ASSISTANT SECRETARIES OF DEFENSE
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTOR, NET ASSESSMENT
DIRECTORS OF DEFENSE AGENCIES
COMMANDERS-IN-CHIEF OF THE UNIFIED AND SPECIFIED COMMANDS

SUBJECT: Policy Guidance for the Employment of Nuclear Weapons (NUWEP)

To enhance deterrence and thereby reduce the dangers of nuclear war -- which is at once a military, a political, and a moral objective -- we must continue to pursue an integrated policy of force modernization, equitable and verifiable agreements on arms limitations, and more credible doctrine and plans for the employment of nuclear weapons. To insure achievement of the latter, the attached Policy Guidance for the Employment of Nuclear Weapons (NUWEP) sets forth in accordance with national guidance (PD-59) policy for the employment of nuclear weapons.

NUWEP has important elements of continuity with past guidance, but it is intended to yield improvements in employment flexibility, provide the basis for strengthening endurance of forces and supporting C^3I, and produce better interaction between policymakers and military planners. We should seek through plans we develop, the forces and C^3I systems we procure, the exercises that we conduct, and the operational practices we employ to convince our adversaries that they could not and would not "win" a nuclear war in any meaningful sense, however they may define winning. To this end each of you should fully understand and carefully take into account the attached policy guidance in future actions.

Harold Brown

~~CONFIDENTIAL~~

IV. STRATEGY FOR EMPLOYMENT

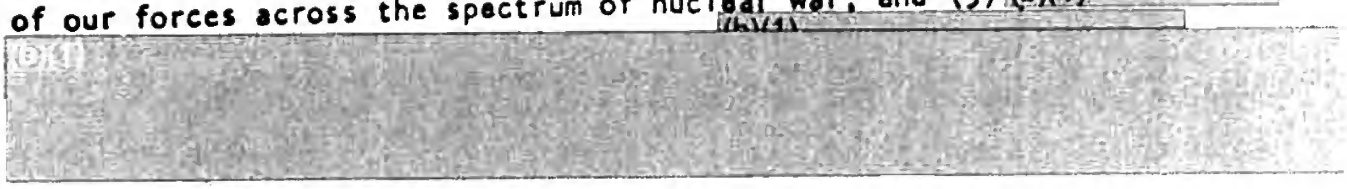
A. Flexibility

(U) The U.S. must have the capability to respond appropriately and effectively to any level of Soviet aggression, over the continuum of nuclear weapon employment options, ranging from use of a small number of strategic and/or theater nuclear capable weapon systems in a contingency operation, to a war employing all elements of our nuclear forces in attacks against a broad spectrum of enemy targets. The ability to respond with selectivity to less than an all-out Soviet attack in keeping with the needs of the situation is required in order to provide the National Command Authorities (NCA) with suitable alternatives, strengthen deterrence, and enhance the prospects of limiting escalation of the conflict. In addition to pre-planned options we need an ability to design employment plans on short notice in response to the latest and changing circumstances. To advance the goal of flexibility, planning will provide an objective-oriented series of building block options for the employment of nuclear weapons in ways that will enable us to employ them consonant with our objectives and the course of the conflict.

~~(C)~~ As it evolves, the building block approach should provide plans which satisfy a hierarchy of targeting objectives and which will provide the NCA an improved capability to employ nuclear weapons effectively in as measured and controlled a manner as feasible in case of a limited conflict. It should provide complementary elements which can be combined in an integrated and discrete manner to provide larger and more comprehensive plans for achieving politico-military objectives in specific situations. The building block approach places emphasis on the individual elements, their objective utility, and our ability to employ them separately or in total. However, this does not imply that the total plan be finely divisible--practical realities cannot be ignored. The desire for enhanced flexibility in employment must be balanced by practical consideration of the increased complexity incurred in planning and operations, the need to avoid compromising the effectiveness and workability of the larger options, and the need to maintain a responsive decisionmaking and force execution process.

B. Endurance

~~(S)~~ Endurance of forces and supporting C^3I can strengthen the US defense posture by: (1) ensuring that the U.S. is not placed in a "use or lose" situation that might result in an unwarranted escalation of the conflict; (2) providing a hedge that allows us to adapt the employment of our forces across the spectrum of nuclear war; and (3) (b)(1)



RECOVERY FROM NUCLEAR ATTACK

by

Jack C. Greene
Robert W. Stokley
John K. Christian

International Center for Emergency Preparedness
Washington, D.C. 20006

for

Federal Emergency Management Agency
Washington, D.C. 20472

DCPA01-78-C-0270
Work Unit 3539B
Dr. David W. Bensen (COTR)

December 1979

INTRODUCTION

On December 5, 1945, just 4 months after the news flash that an atomic bomb had been developed by the United States and had been dropped on Japan, Dr. Hans Bethe, Nobel prizewinner and one of the designers of the bomb, was called before the Special Committee on Atomic Energy of the U.S. Senate. The Committee was concerned that an atomic explosion might "ignite" the earth's atmosphere or start some sort of chain reaction in the air or in the ocean.

Dr. Bethe succeeded in reassuring the Committee that these and other "end-of-the-world" type effects are not to be expected. In general, such extreme fears no longer are taken seriously. However, other almost equally catastrophic visions have arisen to take their place. They include:

— the triggering of a new ice age, to be caused by the vast quantities of debris that would be thrown into the stratosphere and would serve to deflect the sun's rays away from earth. (Although we cannot rule out the possibility of some changes in climate if a very large scale nuclear exchange should occur, most of the particles would descend airly quickly and the changes in climate, even if noticeable, would be transitory.)

— upsetting the delicate balance of nature, leading to disastrous changes in the ecological systems. For example, it has been suggested that since birds are more sensitive than insects to gamma radiation, fallout could kill off the birds - the predators - leaving the insects - the prey - to multiply without control. (Study has shown that when other relevant factors are considered, this is not likely to occur. The insects would be subjected to much more beta radiation than the birds, and control mechanisms other than simple predator/prey relationships affect population control.)

— creation of vast radioactive wastelands that would be uninhabitable for generations. Some areas, especially near ground - zero of surface - burst weapons, would continue to be highly radioactive for many years. (Much of the country, however, would be scarcely affected at all and much of it initially interdicted because of fallout could be reclaimed by decontamination, or, within weeks or months, could be used after the natural radioactive decay had reduced the radiation levels to acceptable values.)

— great increases of leukemia and other malignancies among the survivors - due to exposures to fallout radiation. In the 50's and early 60's many people believed that survivors of a nuclear attack inevitably would die of bone cancer from Strontium-90, (Research has shown that Strontium-90 is not the hazard it was first thought to be. The basic reason is that most of the bomb-produced Strontium-90 is not "biologically available;" that is, it does not get into the food chain. Also, methods for decontaminating food have been developed if the need should ever arise. Some increase in the rate of malignancy among survivors of a nuclear attack would be expected, but in no sense would the increase threaten the survival of the society.)

— vast increases in congenital defects due to gene mutations caused by radiation, lasting for many generations. (Some radiation-induced genetic mutations would occur among the survivors of a nuclear war, but, as in the case of the malignancies, their impact would not be important in terms of the survival of the society.)

— depletion of the ozone layer in the stratosphere. This could decrease protection from ultraviolet radiation and cause proliferation of skin cancers, kill wild and domestic animals, and make it difficult, if not impossible, to grow many of the crops that provide our food and fiber. (This hypothesis is the latest and its validity is yet to be established one way or the other. If research confirms that ozone depletion resulting from the detonation of nuclear bombs is a serious potential hazard, research would be needed to evaluate the degree of the hazard and what could be done to reduce its effects.)

— breakdown of our highly sophisticated and complex social and economic systems due not only to loss of key facilities and personnel, but also because of functional disruption and behavioral breakdowns. (This hypothesis is less specific than those relating to the physical effects of nuclear weapons, and is much more difficult to formulate or investigate. It remains at this time one of the major "unknowns.")

An underlying basis for these negative hypotheses may be psychological. If everyone "knew" that nuclear war would mean the end of the human species, somehow the world would appear more secure since no sane person would initiate a series of events that would lead to everyone s death, including his own. In such a way does the idea of "assured destruction" contain elements of reassurance to some people.

The potential threats to recovery from nuclear war have received a significant amount of study. The Defense Civil Preparedness Agency (and its predecessors) in the decade from 1963 to 1973 allocated some $17 million to research in the general area of postattack recovery. The Federal Preparedness Agency (and its predecessors) have conducted both contract and in-house research at a cost of another several million dollars, with much of this FPA work focused almost exclusively on the problem of economic recovery.

Other agencies have also been involved. From the early days following World War II the former Atomic Energy Commission and its successors, now the Department of Energy, have sponsored elaborate research programs aimed at investigating the various possible deleterious consequences of exposure to ionizing radiation and developing means of protecting against them. This radiological research program has included a cooperative effort with the Japanese to study the longer-term effects of radiation exposure on the survivors of Hiroshima and Nagasaki and their offspring. This program continues today, and will for many years to come.

To date, approximately $1.5 billion has been allocated by the AEC and its successors for research associated with ionizing radiation and its effects. From these 30 years of scientific studies, much is known about the hazards of radiation — more than is known about many of the other hazards that man faces, probably including the common cold.

Robert Scheer

WITH ENOUGH SHOVELS:

Reagan, Bush & Nuclear War

"Dig a hole, cover it with a couple of doors and then throw three feet of dirt on top... It's the dirt that does it... if there are enough shovels to go around, everybody's going to make it."

—T. K. Jones, Deputy Under Secretary of Defense for Strategic and Theater Nuclear Forces

"President Ronald Reagan had been in office less than a year when he approved a secret plan for the United States to prevail in a protracted nuclear war. This secret plan, outlined in a so-called National Security Decision Document, committed the United States for the first time to the idea that a global nuclear war can be won."

With these words Robert Scheer, the distinguished national reporter for the *Los Angeles Times*, begins this astonishing revelation of how a handful of Cold War ideologues—led by the President himself—have reversed the longstanding American assumption that nuclear war means mutual suicide.

Scheer reveals that President Reagan finds it "ridiculous" to assume that nuclear war means mutual destruction.

Robert Scheer's aim in *With Enough Shovels* is to expose the deadly course on which we are now embarked, a course that categorically rejects the strategic assumptions that prevailed from Presidents Eisenhower through Carter and that sustained the Nixon-Kissinger program of détente—a program which our current leaders call "appeasement." Instead they have chosen to pursue nuclear brinksmanship. As Richard Perle, the man whom President Reagan appointed Assistant Secretary of Defense for International Security Policy, told Scheer, "I've always worried less about what would happen in an actual nuclear exchange than the effect that the nuclear balance has on our willingness to take risks in local situations."

ROBERT SCHEER is a national reporter for the *Los Angeles Times* and has also written frequently for *Esquire*, the *Washington Post* and *Playboy*, where he conducted the interview in which Jimmy Carter revealed the lust in his heart.

FM 100-30

NUCLEAR OPERATIONS

Headquarters, Department of the Army

Field Manual
100-30

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 29 October 1996

NUCLEAR OPERATIONS

CONTENTS

PREFACE

In the past, Soviet-styled armored echeloned formations were the primary threat to the United States (US). In response to this threat the US designed and stockpiled tactical nuclear weapons. Today's threats consist of regional instabilities and the proliferation of weapons of mass destruction (WMD). However, the US, as well as many other nations, actively pursues a policy of nonproliferation. Despite this, the number of nations who have, or are developing, nuclear weapons continues to grow. Therefore, the US may some day find itself confronted by an opponent who possesses nuclear weapons. Because of the continuing reduction in the size of US military forces, the US could also find itself opposed by an overwhelming conventional threat. Either scenario could lead to the use of nuclear weapons. Therefore, the US must concern itself with countering the proliferation of weapons of mass destruction.

Despite the continuing drawdown of US military forces, the current national military strategy includes fighting and winning two near-simultaneous regional wars with conventional forces. Any US threat of employing nuclear weapons is to deter a potential adversary's use of such weapons. If deterrence fails. the goal is to end hostilities on terms acceptable, at the lowest level of conflict, to the US and its allies. However, the US unilaterally reserves the right to use nuclear weapons if necessary. Use would be restricted, of course, with tight limits on the area and time of use. This would allow the belligerent to recognize the "signal" of limited response and to react accordingly.

The Army describes battlefield nuclear warfare (BNW) in terms of being able to conduct continuous combat operations in a nuclear environment. The presence of any nuclear-capable system, before, during, or after nuclear-weapons employment by either friendly or enemy forces, creates a nuclear environment. The implications of their very presence creates the nuclear environment.

Before 1991, the US Army had custody of tactical nuclear weapons which were to be employed, on Presidential release, by organic Army field artillery units. In September 1991, the Presidential Nuclear Initiative (PNI) removed the organic nuclear responsibility from the US Army. Today the Army neither has custody of nuclear weapons nor do corps and divisions employ them. The US Air Force or the US Navy are now responsible for delivery of nuclear weapons in support of Army operations. The Army retains its role in nominating nuclear targets and is also responsible for nuclear force protection.

This manual establishes Army doctrine for operations in a nuclear environment and details the doctrine for integrating nuclear considerations into all other aspects of the battlefield. It also describes the Army's role in nominating targets at corps and above levels and protecting the force from the effects of nuclear weapons detonation.

Nuclear operations may occur at strategic, operational, and tactical levels of war. Nuclear employment in a theater of operations has theater strategic, operational, and tactical results; execution has national strategic implications. The corps' role is to function at either the tactical or operational levels of war. At the tactical level, the corps accomplishes missions as Field Manual (FM) 100-15 describes. At the operational level, when directed and augmented, the corps functions as either the Army force (ARFOR), the joint force land component command (JFLCC), or a joint task force (JTF). By viewing the corps in its many possible roles, the reader can also discern nuclear procedures for echelons above corps (EAC) and joint missions.

This manual can help educate and train commanders and staffs at corps and operational levels in nuclear operations and educate and train divisions in nuclear force protection. It is used with Joint Publications (JP) 3-12.1, 3 -12.2 (SRD), or 3-12.3, and serves as the bridge between joint and

DETERRENCE

Although the US military force's overriding mission is to deter war, especially nuclear war, the intent behind the 1991 Presidential Nuclear Initiative (PNI) was to enhance national security through arms reduction while preserving the capability to regenerate selected forces if required. Recent arms control agreements and unilateral initiatives provide for real reductions in the arsenals of nuclear powers. However, even with the most optimistic outlook, the sheer number of remaining weapons is formidable. An increasing number of potentially hostile states are developing or have the capability to develop weapons of mass destruction. Therefore, the US must maintain a modem, reliable, and fully capable strategic deterrent as its number one defense priority.

Deterrence is the product of a nation's military capabilities and that nation's willingness to use those capabilities. The US' policy is to terminate conflict at the lowest possible level of violence consistent with national and allied interests. The ability to conduct operational- and tactical-level nuclear activities enhances US deterrent policy.

The potential employment of nuclear weapons at theater level, when combined with the means and resolve to use them, makes the prospects of conflict more dangerous and the outcome more difficult to predict. The US' position is that it can achieve deterrence if any potential enemy believes the outcome of nuclear war to be so uncertain, and the conflict so debilitating, that he will have no incentive to initiate a nuclear attack. The resulting uncertainty reduces a potential aggressor's willingness to risk escalation by initiating conflict.

At the same time, a credible defensive capability, which would include the threat of employing nuclear weapons, could bolster the resolve of allies to resist an adversary's attempts at political coercion. For example, the US' capability of responding to biological and chemical attacks with nuclear weapons would likely reduce or eliminate such attacks.

Nuclear weapons contribute to but do not by themselves ensure deterrence. To have a credible nuclear deterrent requires a nation to have the means, the ability, and the will to employ nuclear weapons. The nation must also have—

- A reliable warning system.
- A modern nuclear force.
- The capability and flexibility to support a spectrum of response options.
- A deployable defensive system for theater protection.

The threat of nuclear escalation is a major concern in any military operation involving the armies of nuclear powers. Controlling escalation is essential to limiting a rational threat's incentive for nuclear response. Escalation control involves a careful selection of options to convey to the enemy that, although the US is capable of escalating operations to a higher level, it has deliberately withheld strikes.

The US views restraint in the use of nuclear weapons as an important way to control the escalation of warfare. Restraint provides leverage for a negotiated termination of military operations. However, the US cannot assume a potential enemy will view restraint in the same way, or that he will not employ weapons of mass destruction. Therefore, the US must be capable of deploying those forces necessary to defeat aggression, provide coercion, and bring the war to a speedy termination on terms favorable to the US and its allies. Commanders and staffs at all levels must continue to be familiar with nuclear-weapons effects, the actions required to minimize such effects, and the risks associated with using nuclear weapons.

THE THREAT

The Cold War era's definitive threats to American security were nuclear surprise attack and the possible invasion of Western Europe. The new threat is worldwide regional instability (including the possible regional use of nuclear weapons) coupled with the proliferation of weapons of mass destruction.

Developing countries as well as regional powers are gaining the ability to manufacture nuclear arsenals. The current threat from developing nations primarily consists of short- and intermediate-range ballistic and cruise missiles and aircraft capable of carrying nuclear weapons and other weapons of mass destruction. Other threats, such as terrorists groups, may also possess nuclear weapons.

A nation that has the capability of using ballistic or cruise missiles and high-speed aircraft to deliver weapons of mass destruction at extended ranges

significantly increases those weapons' effectiveness as instruments of terror. Such capability also enhances the possibility of conflict escalation beyond a hostile region's boundaries.

The use of, or the threat of using, weapons of mass destruction within a campaign or major operation can cause large-scale shifts in objectives, phases, and courses of action (COA). Nuclear weapons make it possible to drastically change the effective ratio of regional forces and equipment and to create conditions favorable to a threat's operations. Consequently, if a potential adversary is not successful conventionally, he might consider using weapons of mass destruction.

The most accepted enemy employment methodology to destroy critical targets is surprise. A potential enemy might try to destroy massed units and all other critical targets using various nuclear-weapons burst options (space bursts, air bursts, surface bursts, below-surface bursts). Such attacks might be single attacks or part of a group of massed nuclear strikes. Therefore, retaliation or escalation would result in the likelihood of nuclear use against friendly forces. Or, retaliation or escalation could be used in response to an enemy's first use of weapons of mass destruction.

One element of the commander's critical information requirements (CCIR) is determining if the theater threat is capable of using weapons of mass destruction. The answer dictates future command actions.

PROLIFERATION, NONPROLIFERATION, AND COUNTERPROLIFERATION

Proliferation is the process by which one nation after another comes into the possession of or attains the right to determine the employment of nuclear weapons, each potentially able to launch a nuclear attack upon another nation. Nonproliferation efforts focus on preventing the spread of missiles and weapons of mass destruction through arms and export controls beyond the scope of corps and EAC interest. Counterproliferation strategy focuses on military measures centering both on how to deter or discourage as well as how to defend and attack against the possible use of such weapons.

The Department of Defense's (DOD) counterproliferation initiative recognizes the goal of preventing proliferation of weapons of mass destruction and their associated delivery systems. It also recognizes that the US must continue to expand its efforts to protect forces, interests, and allies. The initiative has two fundamental goals:

- To strengthen DOD's contribution to governmentwide efforts to prevent, or diplomatically reverse, the acquisition of weapons of mass destruction.
- To protect US interests and forces (as those of its allies) from WMD effects by assuring that US forces have the equipment, doctrine, and intelligence needed to confront, if necessary, any future opponent who possesses weapons of mass destruction.

The Department of Defense marshals its unique technical, military, and intelligence expertise—

- To improve arms control compliance.
- To control exports.
- To inspect and monitor the movement of nuclear materials.
- To interdict shipments for inspection during crises.
- To strengthen the norms and incentives against WMD acquisition.

The Department of Defense's acquisition strategy in the areas of command, control, communications, and intelligence (C^3I), counterforce operations, active defense, and passive defense address the following critical counterproliferation challenges:

- Detecting and destroying WMD capabilities from production through storage to deployment.
- Conducting military operations in a WMD environment.
- Dealing with consequences of WMD use, including medical treatment, clean-up, and recovery.
- Coping with the diffusion of new technologies.

NOTE: This manual concerns the nuclear part of weapons of mass destruction.

Although nuclear weapons are an element of deterrence, potential regional adversaries might or might not understand the deterrence value of the

US' nuclear weapons. If the goals of promoting peace, deterring war, and resolving conflicts fail, deterrence fails. Therefore, fighting and terminating hostilities become paramount. United States doctrine assumes that if the potential foe is capable of using weapons of mass destruction, then US forces must act accordingly.

NUCLEAR FORCES

Nuclear-capable forces (Navy and Air Force) are instruments of national power in regional conflicts. They contribute to theater deterrence or provide a war-fighting option to the NCA.

Because the Army no longer has an organic nuclear capability, the Navy or Air Force will provide nuclear support. The Army can now only nominate nuclear targets, usually at no lower than the corps level. The division normally is limited to NBC protection activities.

The capability of the US to deploy nuclear forces into a theater significantly complicates the enemy's planning process. The alert status of nuclear forces is a function of the world situation at any given time and, thus, enhances their responsiveness.

LEADERSHIP

Battlefield stress in a nuclear environment will be higher than US forces have ever experienced. Only disciplined, well-trained, and physically fit units can function well in such an environment. Commanders who understand this and who provide soldiers with strong, positive leadership; good mental and physical preparation; and clear, comprehensive plans will ensure soldiers are in a better position to survive and win.

Units may have to operate with reduced mutual support and fire support, with degraded electronic communications abilities along extended lines of communications (LOC), and possibly without centralized control or continuous communications. Therefore, to improve command and control (C^2) leaders must work toward three general goals (which take on added importance in nuclear operations):

1. Instill an aggressiveness in their units that will transcend the shock and stress of the nuclear environment.
2. Train junior leaders to think and operate independently.
3. Develop small-unit cohesion.

Commanders and staffs must fully understand the potential of nuclear-weapons use by both an adversary and by a US joint force. They must also have a working knowledge of—

- Nuclear-weapons effects.
- Employment doctrine.
- Survivability measures necessary to preserve combat power.
- Medical requirements as a result of a nuclear explosion.
- The psychological impact of nuclear warfare on soldiers and units.

As commanders plan and fight successive battles involving actual or possible nuclear operations, they must continually assess their soldiers' psychological and physiological stresses. Commanders must emphasize situations in training, exercises, and leadership which will help soldiers accomplish their missions.

TRAINING

On a nuclear battlefield every soldier will confront new and strange circumstances and be under constant danger of attack. Nuclear weapons will quickly cause many casualties as well as intermediate and long-term radiation effects. Soldiers will be exposed to death and destruction of a magnitude far beyond imagination and may have to operate in widely dispersed, isolated, and semiindependent groups. Everyone must understand and practice survival and mitigation techniques. Such techniques will give soldiers direction and confidence in a confusing, frightening situation.

The large and sudden losses that a nuclear attack will cause will shock and confuse inadequately trained or psychologically unprepared troops. Reaction times will be slower, and the ability to respond to leadership and the desire to perform at peak proficiency may be degraded. The violence, stress, and confusion can easily divert attention from battlefield objectives. Extraordinary discipline and leadership are vital to overcoming distractions,

maintaining the mission's focus, and pressing the fight.

Training, the cornerstone of success, technically and psychologically prepares soldiers for the nuclear environment. Successful nuclear operations require expanded combat training that includes—

- Mitigation techniques against nuclear effects.
- Radiation monitoring.
- Decontamination techniques.
- Operations exploiting nuclear-weapons use.
- Recovering and regrouping after an attack.
- Handling mass casualties.
- Having to use degraded resources to accomplish the mission.
- Nominating nuclear targets.

Soldiers will fight as well or as poorly as they have been trained. Clear, concise policies and guidelines provide control and direction. Commanders must emphasize the fact that aggressive maneuver, even by relatively small units, will have a high probability of success in the confused aftermath of a nuclear attack.

NOTE: See FM 25-50 for in-depth discussions of these topics.

SUMMARY

This chapter describes the transition of joint nuclear doctrine to Army-oriented nuclear doctrine. A nuclear environment exists if either adversary in the conflict possesses nuclear capabilities. The levels of war clarify simultaneous activities Army forces conduct in the theater. Each level supports the next higher level of war.

The overall mission of military forces is to deter war—especially nuclear war. If deterrence fails, the US must be capable of deploying the forces necessary to defeat aggression, provide cohesion, and bring war to a speedy termination on terms favorable to the US and its allies.

The threat is worldwide regional instability (including possible use of nuclear weapons) coupled with the proliferation of weapons of mass destruction. Proliferation occurs when nations acquire and have the ability to use nuclear weapons against another nation. Nonproliferation activities attempt to prevent the spread of weapons of mass destruction. Counterproliferation centers on how to deter, defend, and attack against possible use of nuclear weapons.

In the event of either friendly or enemy nuclear-weapons use, commanders must provide soldiers with strong positive leadership, good mental and physical preparedness, and clear comprehensive plans. Positive leadership will ensure soldiers survive and win. Training is the cornerstone for success.

Enemy

Anticipating and planning against the effects of enemy nuclear-weapons use against friendly forces is critical to campaign design. Commanders must ask, "Does the enemy have nuclear capability?" If the answer is no, the question is moot. If the answer is yes, commanders must address issues such as dispersion, type, yield, delivery means, availability of weapons, doctrine, tactics, and the likelihood of use.

Troops

The number and type of troops available could greatly affect the tactical plan. Nuclear weapons can rapidly and decisively enhance combat power. Smaller forces possessing nuclear weapons can accomplish the mission of larger forces not possessing nuclear weapons. The unit's RES determines its fitness for duty. The lower the RES, the healthier the soldiers.

NOTE: See FM 3-3-1.

Terrain and Weather

Terrain and weather can affect nuclear-weapons operations and influence offensive maneuver. For example, tree blowdown in a heavily forested area would obstruct the forward movement of friendly forces.

Normally, tactical fallout will not be significant in a low air burst. However, weather conditions could cause rainout in the area of operations. Therefore, if rain or snow falls through a nuclear cloud, significant tactical fallout may occur. Rain and fog can also lessen the blast wave as it travels through dense air.

Time Available

Offensive actions become harder to conduct when the enemy has had time to organize his defense. The friendly commander can nominate nuclear weapons to effect surprise, prolong confusion, and sustain disorganization. Conversely, the nomination process can erode friendly units' available time because of the necessity of having to relay information and requests up through the chain of command and back down again.

CONDUCTING OFFENSIVE OPERATIONS

The commander plans and coordinates force movement in detail to avoid confusion and delay and to gain surprise. He concentrates his forces quickly, making maximum use of cover and concealment, signal security, and deception while avoiding or masking actions that would alert the enemy to the coming attack. He then conducts the attack rapidly and violently with concentrated firepower to disrupt enemy positions and hit deep in the enemy rear. Nuclear weapons can enhance and support such plans by providing—

- Destructive firepower. Nuclear weapons, even when limited, can help friendly forces cause great destruction of enemy positions with a minimum concentration of forces.
- Surprise. Because delivery of nuclear fires requires little visible unit preparation, surprise can be complete. However, OPSEC within the stockpile-to-target sequence is essential. Forces must avoid a great display of preparation before nuclear strikes to prevent the loss of surprise.
- Shock. Nuclear-weapons use disorganizes, demoralizes, and freezes enemy forces in place. However, these effects will only be temporary; exploitation must be immediate.
- Flexibility. As maneuver forces develop the situation, the commander can nominate nuclear weapons to develop a major operation. He might also substitute nuclear weapons for maneuver forces, allowing a smaller force to succeed in its attack against a stronger force.
- Obstacles. A nuclear weapon can alter terrain to create obstacles such as fallen trees, fires, craters, rubble, and radiation. This nearly instant creation of massive obstacles will allow a smaller force to succeed where a larger force might ordinarily be required. Creation of obstacles slows and canalizes counterattacks and denies terrain to the threat. But, like shock and surprise, obstacles are temporary. Conversely, obstacles can impede forward maneuver if the commander has not considered least-separation distances.

Nuclear weapons can provide the commander with a unique advantage. However, he equally

100-15 *Corps Operations.* This manual contains operational-level doctrine to corps commanders and staffs.

100-16 *Army Operational Support.*

100-17 *Mobilization, Deployment, Redeployment, Demobilization.*

Joint Publications (JP)

1-02 *Department of Defense Dictionary of Military and Associated Terms.*

3-12 *Doctrine for Joint Nuclear Operations.* This publication sets forth doctrine for the combatant commander to use for the conduct of joint nuclear operations. It guides the joint planning and employment of US nuclear forces.

3-12.1 *Doctrine for Joint Nonstrategic Nuclear Weapons Employment.* This publication provides guidance for nuclear-weapons employment. Doctrine and guidance apply to the commander of combatant commands, subordinate unified commands, joint task forces, and subordinate components of these commands.

3-12.2 (SRD) *Nuclear Weapons Employment and Effects Data* (U). This publication sets forth doctrine and selected TTP for joint operations and training. It is the accepted joint standard for nuclear target analysis, employment procedures, and the source for nuclear effects data.

3-12.3 *Nuclear Weapons Employment and Effects Data.*

Department of Defense Nuclear Agency Effects Manuals (DNA EM)

1 (SRD) Chapter l0 Electromagnetic Pulse.

Chapter 14 Effects of Personnel.

Chapter 15 Damage to Structures.

Chapter 17 Damage to Military Field Equipment.

Chapter 21 Damage to Missiles.

NOTE: DNA is now known as the Defense Special Weapons Agency (DWA).

RELATED PUBLICATIONS

Related publications are sources of additional information. They are not required in order to understand this publication.

Allied Tactical Publications (ATP)

35A *Land Force Tactical Doctrine.* This publication establishes common NATO doctrine for the use of land force commanders in military operations when NATO forces are placed under their command.